

Fishery Data Series No. 06-05

Kobuk River Test Fishing Project, 2005

by

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Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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Weights and measures (metric)		General		Measures (fisheries)	
centimeter	cm	Alaska Administrative		fork length	FL
deciliter	dL	Code	AAC	mid-eye-to-fork	MEF
gram	g	all commonly accepted		mid-eye-to-tail-fork	METF
hectare	ha	abbreviations	e.g., Mr., Mrs., AM, PM, etc.	standard length	SL
kilogram	kg			total length	TL
kilometer	km	all commonly accepted			
liter	L	professional titles	e.g., Dr., Ph.D., R.N., etc.	Mathematics, statistics	
meter	m			<i>all standard mathematical</i>	
milliliter	mL	at	@	<i>signs, symbols and</i>	
millimeter	mm	compass directions:		<i>abbreviations</i>	
		east	E	alternate hypothesis	H _A
Weights and measures (English)		north	N	base of natural logarithm	<i>e</i>
cubic feet per second	ft ³ /s	south	S	catch per unit effort	CPUE
foot	ft	west	W	coefficient of variation	CV
gallon	gal	copyright	©	common test statistics	(F, t, χ^2 , etc.)
inch	in	corporate suffixes:		confidence interval	CI
mile	mi	Company	Co.	correlation coefficient	
nautical mile	nmi	Corporation	Corp.	(multiple)	R
ounce	oz	Incorporated	Inc.	correlation coefficient	
pound	lb	Limited	Ltd.	(simple)	r
quart	qt	District of Columbia	D.C.	covariance	cov
yard	yd	et alii (and others)	et al.	degree (angular)	°
		et cetera (and so forth)	etc.	degrees of freedom	df
Time and temperature		exempli gratia		expected value	<i>E</i>
day	d	(for example)	e.g.	greater than	>
degrees Celsius	°C	Federal Information		greater than or equal to	≥
degrees Fahrenheit	°F	Code	FIC	harvest per unit effort	HPUE
degrees kelvin	K	id est (that is)	i.e.	less than	<
hour	h	latitude or longitude	lat. or long.	less than or equal to	≤
minute	min	monetary symbols		logarithm (natural)	ln
second	s	(U.S.)	\$, ¢	logarithm (base 10)	log
		months (tables and		logarithm (specify base)	log ₂ , etc.
Physics and chemistry		figures): first three		minute (angular)	'
all atomic symbols		letters	Jan,...,Dec	not significant	NS
alternating current	AC	registered trademark	®	null hypothesis	H ₀
ampere	A	trademark	™	percent	%
calorie	cal	United States		probability	P
direct current	DC	(adjective)	U.S.	probability of a type I error	
hertz	Hz	United States of		(rejection of the null	
horsepower	hp	America (noun)	USA	hypothesis when true)	α
hydrogen ion activity	pH	U.S.C.	United States	probability of a type II error	
(negative log of)			Code	(acceptance of the null	
parts per million	ppm	U.S. state	use two-letter	hypothesis when false)	β
parts per thousand	ppt, ‰		abbreviations	second (angular)	"
			(e.g., AK, WA)	standard deviation	SD
volts	V			standard error	SE
watts	W			variance	
				population	Var
				sample	var

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TABLE OF CONTENTS

	Page
LIST OF TABLES.....	ii
LIST OF FIGURES.....	ii
LIST OF APPENDICES	ii
ABSTRACT	1
INTRODUCTION.....	1
Objectives	1
METHODS.....	2
Site Description	2
Test Fishing	2
Standardized Catches.....	2
Age, Sex, and Length	3
Atmospheric and Hydrologic Observations.....	3
RESULTS.....	3
DISCUSSION.....	4
REFERENCES CITED	6
TABLES AND FIGURES.....	7
APPENDIX A. CATCH PER UNIT EFFORT.....	25
APPENDIX B. AGE, SEX, AND LENGTH.....	35
APPENDIX C. SHEEFISH	43

LIST OF TABLES

Table	Page
1. Kobuk River test fish chum salmon CPUE by day, drift, and site, 2005.....	8
2. Kobuk River test fish chum salmon CPUE indices, mean CPUE, and percent by drift and site, 2005.	9
3. Kobuk River age and sex composition of chum salmon test fish catch samples, 2005.....	10
4. Length by age and sex of Kobuk River chum salmon test fish catch samples, 2005.	11
5. Noatak River age and sex composition of chum salmon test fish catch samples, 2005.	12
6. Length by age and sex of Noatak River chum salmon test fish catch samples, 2005.....	13
7. Commercial chum salmon catch samples age and sex composition, Kotzebue Sound, 2005.	14
8. Length by age and sex of Kotzebue commercial chum salmon catch samples, Kotzebue Sound, 2005.	16
9. Kobuk River atmospheric and hydrologic data, 2005.	18
10. Kobuk River test fish sheefish CPUE by day, drift, and site, 2005.....	19
11. Kobuk River test fish sheefish CPUE indices, mean CPUE, and percent by drift and site, 2005.	20

LIST OF FIGURES

Figure	Page
1. Kotzebue Sound commercial fishing district, villages and subsistence fishing areas.	21
2. Kobuk River test fishing sites.	22
3. Kobuk River test fishing site bottom profile, 2005.	23
4. Kobuk River chum salmon test fish cumulative CPUE, 1993–2005.....	24

LIST OF APPENDICES

Appendix	Page
A1. Kobuk River chum salmon test fish mean daily and cumulative CPUE, 1993–1997.....	26
A2. Kobuk River chum salmon test fish mean daily and cumulative CPUE, 1998–2002.....	27
A3. Kobuk River chum salmon test fish mean daily and cumulative CPUE, 2003–2005.....	28
A4. Kobuk River chum salmon test fish mean daily and cumulative CPUE proportions, 1993–1997.	29
A5. Kobuk River chum salmon test fish mean daily and cumulative CPUE proportions, 1998–2002.	30
A6. Kobuk River chum salmon test fish mean daily and cumulative CPUE proportions, 2003–2005.	31
A7. Kobuk River chum salmon test fish cumulative CPUE comparison, 1993–2005.	32
A8. Kobuk River escapement, subsistence, test fish, and Kotzebue commercial chum salmon catch data, 1993–2005.....	33
A9. Kobuk River chum salmon test fish time and site distribution expressed as mean CPUE, 1993–2005.	34
B1. Comparison of age and sex compositions by year for Kobuk River test-net chum salmon catch, 1993–2005.	36
B2. Comparison of age and sex compositions by year for Kotzebue commercial chum salmon catch, 1993–2005.	37
B3. Comparison of age and sex compositions by year for Noatak River test fish chum salmon catch, 1993–2005.....	38
B4. Comparison of length by age, sex, and year for Kobuk River test fish chum salmon catch, 1993–2005.....	39
B5. Comparison of length by age, sex, and year for Kotzebue commercial chum salmon catch, 1993–2005.....	40
B6. Comparison of length by age, sex, and year for Noatak River test fish chum salmon catch, 1993–2005.....	41
C1. Kobuk River sheefish test fish mean daily and cumulative CPUE, 1997 and 1999–2005.	44
C2. Kobuk River sheefish test fish mean daily and cumulative CPUE proportions, 1997 and 1999–2005.....	46
C3. Kobuk River sheefish test fish comparison, 1997–2005.	48
C4. Kobuk River sheefish test fish time and site distribution expressed as mean CPUE, 1997–2005.....	49

ABSTRACT

Catch statistics and age, sex, and length (ASL) data for chum salmon *Oncorhynchus keta* from the 2005 Kobuk River drift gillnet test fish project were summarized. A total of 207 drifts were fished from July 7 through August 15 and 1,392 chum salmon were caught. Cumulative catch per unit effort (CPUE) was 1206.55, which ranked sixth highest in the 13 years of the project. The midpoint of the test fishery CPUE was on August 6, which was the latest on record. Age-0.3 chum salmon comprised 84.7% of test fishery samples and was the second highest percentage on record.

Key words: Kobuk, chum salmon, *Oncorhynchus keta*, age, catch per unit effort, test fishery

INTRODUCTION

The Kobuk River originates on the south side of the Brooks Range in the Arrigetch (“Fingers Outstretched”) Peaks inside the Gates of the Arctic National Park. The river flows approximately 500 river miles (800 km) west where it terminates at Hotham Inlet. The lower two-thirds of the river are stained by tannin primarily from the Pah River, an upper river tributary. Five villages are located on the Kobuk River: Norvik, Kiana, Ambler, Shungnak, and Kobuk, and all depend on chum salmon *Oncorhynchus keta* for subsistence use. In addition, residents of Kotzebue also depend on Kobuk River chum salmon as a subsistence resource. Kobuk River is thought to support up to 60% of the commercial catch of chum salmon in the Kotzebue District.

This was the thirteenth consecutive year a drift gillnet test fishing project operated in the lower Kobuk River (Kohler 2000a, b, 2001, 2002; Lingnau 1993-1997; Menard 2003-2004; Menard and Kent 2005). Because of Kobuk River’s tannic stain, test fishing is less susceptible to net avoidance by salmon than in clear water systems. The only previous salmon project in the Kobuk River drainage was a counting tower operated in 1982 and 1984 on the Squirrel River, too distant to provide timely information for fisheries management. This report presents the results of the thirteenth year of the Kobuk River drift test fishing project.

Management of the Kotzebue District commercial salmon fishery, particularly during the month of July, is dependent primarily on comparing commercial fishing period and cumulative season catch statistics to those of prior years. Because of the change in market demand in recent years, these comparisons are no longer reliable. The drift test fish project was initiated because of the need for an inseason index of run timing and abundance for Kobuk River chum salmon stocks, which largely support the first portion of the salmon migration into the Kotzebue District. While test fishing is a relatively low-cost approach, it can also be susceptible to inter-annual variability in catch rates which typically requires the data to be interpreted in a somewhat qualitative way as an abundance index if calibration is not possible between years.

OBJECTIVES

The objectives of the test fishing project for 2005 were to:

1. Evaluate the abundance of chum salmon migrating into the Kobuk River drainage through a comparison of systematic drift gillnet catches.
2. Describe the migratory timing for chum salmon in the lower Kobuk River.
3. Sample chum salmon for age, sex, and length (ASL) data.

The Noatak River is the other major river in the Kotzebue District and it flows approximately 420 river miles (680 km) from its headwaters in the Schwatka Mountains to Kotzebue Sound.

Sporadically in the 1980s and 1990s a sonar project was operated to estimate salmon passage on the Noatak River. The last year of sonar operations was in 1994 (LaFlamme 1995). Periodically, Alaska Department of Fish and Game (ADF&G) and National Park Service personnel will test fish for salmon in the lower Noatak River, usually in August, if personnel are available and if Kotzebue Sound is safe for boat travel. The test fishing location and time fished is opportunistic depending on weather, tide stage, and run strength. ASL sampling is done to compare salmon ages with the Kotzebue commercial catch samples and Kobuk River test fish catch samples.

METHODS

SITE DESCRIPTION

The Kobuk River project is located approximately 70 river miles (110 km) from the eastern boundary of the commercial salmon fishing district (Figure 1). The test fishing site was selected because it was the lowest down stream location where there was a single channel below all tributaries that support spawning chum salmon. The site consists of approximately a 1-mile river section located approximately 3 miles downstream from Kiana. The width of the river is approximately 200 meters and is divided into two sites (Figure 2). Site N is the north side of the river (right bank), which is the cut bank side of the river with the swiftest current. Site S is located on the south side of the river (left bank). Site S is located downstream from a major sandbar and has a more gradual gradient. This site has the slowest current. A bottom profile at the test fish site in 1997 revealed a near uniform bottom with a maximum depth of 6 meters. The deepest portion of the river was in the first quartile from the right bank (Lingnau 1997). The bottom profile, at the test fish site, in 2005 had an average depth of 5.5 meters and a maximum depth of 9 meters in the third quartile from the right bank (Figure 3).

TEST FISHING

Fishing was scheduled to sample salmon passage during four different segments of the day at each of the two sites: morning (0800 hours), midday (1500 hours), and late evening (2200 hours). A 2-person crew conducted drifts 7 days per week.

All test fish drifts were of approximately 20 minutes duration using a 50-fathom gillnet. The net is made of 5 7/8 inch (14.9 cm) stretched mesh multifilament webbing, 40 meshes deep, and hung at a ratio of 2:1. Test fish drifts were conducted from a 20-foot boat, powered by an 85-horsepower outboard motor. If catch rates were high, fishing time was reduced to control mortality. Inadvertently killed fish were primarily given to village elders and other individuals for subsistence purposes. The availability of these fish was announced over a CB radio.

STANDARDIZED CATCHES

Actual catches were converted to catch per unit effort (CPUE) by considering fishing time and the length of net used. Each CPUE index is the number of fish that would have been caught if 100 fathoms of gillnet had been fished for 60 minutes. The index, I , was calculated as follows:

$$I = \left(\frac{c}{(I)(t)} \right) (60 \text{ min.})(100 \text{ fathoms}) \quad (1)$$

where:

c = number of chum salmon caught,

l = length of gillnet in fathoms, and

t = mean fishing time in minutes.

Mean fishing time (t) is defined as the amount of time the entire gillnet is fishing plus half the time it took to deploy and retrieve the net. Mean daily drift CPUE indices were calculated using the sum of the total time fished and total fish caught for each day. Mean daily indices were summed to produce total seasonal CPUE indices for the period of data collection. Cumulative proportions of seasonal total test fish CPUE indices were also calculated and used to estimate the midpoint of the chum salmon run past the test fish site.

The catch rate for each time period and site was determined by using the fishing time and number of fish caught for those specific time periods and sites. Seasonal abundance by site and time period was indexed by summing CPUE indices for each of the daily sites and time periods. Temporal distribution was depicted as a percent calculated by dividing each time period total by the total CPUE indices. Spatial distribution was described as a percent by dividing each site's CPUE seasonal total by the total of both site's CPUE indices. Temporal and spatial distributions are described as a percent since the number of drifts made at each site and the amount of time fished varied (Lingnau 1997).

AGE, SEX, AND LENGTH

ASL data were collected from up to 25 chum salmon per day. Scales were collected from the left side of the fish approximately 2 rows above the lateral line in the area crossed by a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin (INPFC 1963). Scales were mounted on gum cards and impressions made on cellulose acetate cards with a heated hydraulic press (Clutter and Whitesel 1956). Salmon were measured to the nearest 0.5 cm from the mideye to tail fork (METF). The sex of each fish was determined from external characteristics (such as body symmetry, kype development, and presence of an ovipositor).

Salmon ages were determined by examining scales (Mosher 1968). European notation (e.g. 0.3; Koo 1962) was used to record ages; numerals preceding the decimal refer to number of freshwater annuli and numerals following the decimal refer to number of marine annuli. Total age from time of egg deposition or brood year is the sum of both numbers plus one.

ATMOSPHERIC AND HYDROLOGIC OBSERVATIONS

Project personnel recorded standard environmental factors during project operations at 0800 hours. Water level, water temperature, and turbidity (determined by use of a secchi disk) were recorded daily at the site. Visual estimates of cloud cover were also recorded.

RESULTS

Test fishing began with the 2200 hours drifts on July 7 and continued through August 15. As a result of motor problems, no drifts were made from July 8 through July 10. CPUE indices were calculated for each drift and site (Table 1) and compared graphically with other years (Figure 4). There were 1,392 chum salmon, 4 pink salmon *Oncorhynchus gorbuscha*, 1 Dolly Varden *Salvelinus malma*, and 375 Inconnu (sheefish) *Stenodus leucichthys* caught in 207 drifts.

Cumulative chum salmon CPUE was 1206.55 (Table 1). Distribution of chum salmon CPUE indices by site was 47% at site N and 53% at site S (Table 2). Distribution of CPUE indices by time period was 32%, 33%, and 35% caught at 0800, 1500, and 2200 hour drifts, respectively (Table 2). Peak catch and CPUE occurred on August 14 with a catch of 108 chum salmon, which was a mean daily CPUE of 97.44.

A total of 581 chum salmon scales were aged from the test fish catch samples. Test fish sample data were separated into 4 sampling periods. Females comprised the majority of samples in the first 3 periods. Overall females comprised 53% of the season's chum salmon samples. Age-0.3 chum salmon were the largest age group for all 4 sampling periods. Seasonal age composition was 0.2% age-0.2, 84.7% age-0.3, 14.3% age-0.4, and 0.9% age-0.5 fish (Table 3). Comparisons of mean lengths during the season for all sample periods indicated males to be larger than females (Table 4).

Test fishing was conducted three times in August on the Noatak River with similar nets as those used at the Kobuk River project to compare chum salmon ASL composition. Noatak River samples were separated into three sampling periods. Age-0.3 chum salmon were the predominant age class and males comprised the majority of the catch (Table 5). As observed in the Kobuk River chum salmon samples, males were usually larger than females in the Noatak River samples (Table 6).

A total of 2,099 chum salmon scales were aged from the commercial catch samples. Commercial catch samples were separated into seven sampling periods. Males comprised 45.6% and age-0.3 chum salmon comprised 87.2% of the samples (Table 7). Average lengths of commercial catch samples were usually larger for males and average lengths generally increased with age (Table 8).

Climatologic data indicated water temperatures fluctuated between 11 and 17 °C during the season. The water depth fluctuated 42 inches (106.7 cm) during the season and was at its lowest point on August 4 and at its highest point on July 17. Secchi disk readings ranged from 1.50 to 4.50 meters during the season (Table 9).

DISCUSSION

The 2005 Kobuk River test fish project operated from July 7 through August 15. A total of 207 drifts were made with a cumulative CPUE index of 1,206.55. The total number of drifts during the season ranked eighth highest out of 13 years and the cumulative CPUE was the sixth highest (Appendix A3).

Midpoint of the Kobuk River test fishery CPUE was on August 6, which was the latest date in the 13-year history of the project (Appendix A2). The 2005 commercial harvest was approximately 65% of the previous 10-year (1995–2004) harvest average (Appendix A4).

Of the three drift periods each day, the 2200 hours drifts had a larger CPUE during the 2005 season compared to the 0800 hours or 1500 hours drifts. Prior to 2005, larger CPUE's during the 2200 hours drifts only occurred in 1995 (Appendix A5). As in all previous years, most of the catch occurred at the south site. However, the percentage of catch on the north bank (46.9%) was the highest in the 13-year project history.

Test fishing with gillnets results in some selectivity of the size of the fish captured. However, using the same type of net and the same mesh size each year allows for comparison between years. The 2005 chum salmon test fish catch samples had the second highest percentage of age-0.3 fish. The 0.2% of age-0.2 samples was second only to the record low of 0.1% in 2002 (Appendix B1). Last year age-0.2 fish were a record 11.1% of test fish catch samples and the likewise high percentage of age-0.3 fish this year indicates a good survival rate for the 2001 brood year.

Catches by the commercial fishers in 2005 were good and the cumulative CPUE at the test fish site was in the upper half historically. The percentage of age 0.3 samples in the commercial chum salmon catch was 87.2% and was second highest since the 1990s (Appendix B2).

As with the Kobuk River test fish and Kotzebue commercial ASL samples, the Noatak River test fish catch samples in 2005 also had a relatively low percentage of age-0.2 chum salmon, and age-0.3 chum salmon comprised 88.8% of the age structure. In fact, the percentage of age-0.3 chum salmon was a record on the Noatak River. Historical comparisons of Noatak River test fish samples for the past 13 seasons are presented in Appendix B3.

In 2005, chum salmon sampled at the Kobuk project had average lengths that were within the same range observed in previous years (Appendix B4). Chum salmon sampled from the Kotzebue commercial fishery and the Noatak River test fishery also had average lengths that were within the same range observed in previous years (Appendices B5 and B6).

The cumulative sheefish CPUE index was 306.76 (Table 10). CPUE indices were 33.46% at site N, 66.54% at site S, and 35.72%, 34.47%, and 29.81% of CPUE indices were caught at 0800, 1500, and 2200 hours drifts, respectively (Table 11). The peak catch and highest mean daily CPUE occurred on July 16 with a catch of 32 sheefish, with mean daily CPUE of 25.10. Historically, the highest mean daily CPUE for sheefish occurs within the first few days after test fishing begins as the sheefish run is usually at its midpoint the first or second week of July (Appendices C1 and C2). Sheefish cumulative CPUE ranked sixth out of eight years compared, 1997–2005 (Appendix C3). However, the sheefish cumulative CPUE is greatly affected by the test fish project start date. The project is designed to index the chum salmon run and test fishing starts early in the chum run, but usually at the midpoint of the sheefish run. For example, in the first 3 days of test fishing in 2003, 17 chum salmon and 174 sheefish were caught, and those numbers represented approximately 2% of the season's chum catch and 33% of the sheefish catch.

Historical distribution of sheefish CPUE by test fish site and time is presented in Appendix C4. Like chum salmon, most of the sheefish were caught on the south bank in 2005. However, sheefish catches tend to be distributed more equally between the three drift periods than chum salmon in most years.

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TABLES AND FIGURES

Table 1.–Kobuk River test fish chum salmon CPUE by day, drift, and site, 2005.

Date	CPUE by Drift ^a			CPUE by Site ^b		Daily	Cum.
	#1 ^c	#2	#3	N	S	CPUE	CPUE
7/07			9.14	4.62	13.58	9.14	9.14
7/08							9.14
7/09							9.14
7/10							9.14
7/11	0	0	0	0	0	0	9.14
7/12	0	0	0	0	0	0	9.14
7/13	2.31	0	2.35	1.57	1.54	1.55	10.69
7/14	0	6.99	4.49	4.71	2.93	3.79	14.48
7/15	4.62	20.57	9.14	9.41	13.42	11.46	25.94
7/16	2.24	6.86	22.98	18.08	3.00	10.20	36.14
7/17	26.18	23.08	55.71	48.00	22.36	35.34	71.48
7/18	4.62	18.82	22.02	11.05	19.14	15.24	86.72
7/19	42.11	11.43	46.67	28.50	38.80	33.76	120.48
7/20	26.92	16.15	18.11	21.54	19.38	20.44	140.92
7/21	37.78	62.07	24.91	36.14	46.59	42.18	183.10
7/22	22.86	16.00	35.56	16.71	32.59	24.91	208.01
7/23	18.29	7.74	28.62	19.41	24.22	21.55	229.56
7/24	24.44	9.23	24.00	4.74	32.47	19.38	248.94
7/25	11.54	25.38	24.91	14.12	26.83	20.64	269.58
7/26	23.08	22.22	31.40	17.14	33.45	25.58	295.16
7/27	37.28	34.91	32.62	34.29	35.56	34.94	330.10
7/28	4.71	14.12	4.62	7.84	7.74	7.79	337.89
7/29	21.18	22.86	53.10	28.86	37.04	33.00	370.89
7/30	13.98	43.02	53.10	38.52	36.00	37.27	408.16
7/31	33.96	26.34	30.97	38.40	23.04	30.72	438.88
8/01	30.89	52.68	46.45	29.27	55.08	42.12	481.00
8/02	91.64	54.55	45.18	54.31	68.57	60.00	541.00
8/03	14.12	14.12	28.51	17.48	20.26	18.89	559.89
8/04	6.15			0	16.00	6.15	566.04
8/05	31.40	16.70	33.91	23.53	29.81	26.75	592.79
8/06	4.80	26.92	9.60	1.59	26.15	14.07	606.86
8/07			40.75	36.23	45.28	40.75	647.61
8/08	25.63	99.62	43.64	69.73	45.10	57.37	704.98
8/09	79.20	98.53	44.14	65.75	84.71	74.89	779.87
8/10	80.79	55.81	66.98	76.14	60.00	68.57	848.44
8/11	157.71	71.43	36.92	112.23	76.88	95.28	943.72
8/12	79.06	70.11	77.14	71.45	79.37	75.35	1,019.07
8/13	38.18	50.23	92.90	62.69	59.55	61.12	1,080.19
8/14	99.78	113.41	78.14	85.58	108.61	97.44	1,177.63
8/15	12.00	22.74	71.11	37.40	15.16	28.92	1,206.55
Total	1,109.45	1,134.64	1,249.79	1,147.03	1,260.21	1,206.55	

^a Catch per unit effort (CPUE) is calculated in catch/100 fathoms of net/hour.

^b Site N is the north bank (right bank when facing downstream) and site S is the south bank (left bank).

^c Drift 1 begins at 0800 hours, drift 2 at 1500 hours, and drift 3 at 2200 hours.

Table 2.—Kobuk River test fish chum salmon CPUE indices, mean CPUE, and percent by drift and site, 2005.

Drift Period	Season CPUE Indices	No. of Period Drifts^a	Season Mean CPUE	Percent	Station	Season CPUE Indices	No. of Site Drifts	Season Mean CPUE	Percent
1 0800 hrs.	1,109.45	35	31.70	31.77	N North Bank	1,147.03	105	10.92	46.93
2 1500 hrs.	1,134.64	34	33.37	33.44	S South Bank	1,260.21	102	12.36	53.07
3 2200 hrs.	1,249.79	36	34.72	34.79					
Total	3,493.88	105		100.00	Total	2,407.24	207		100.00

^a One drift period is equal to one test fish drift on the north bank and one test fish drift on the south bank. However, during the season, one drift was missed on the south bank during periods 1, 2, and 3 because of motor problems.

Table 3.—Kobuk River age and sex composition of chum salmon test fish catch samples, 2005.

		Brood Year and Age Group				Total
		2002 0.2	2001 0.3	2000 0.4	1999 0.5	
Sampling Dates:		7/07-7/22				
Sample Size:		153				
Male	Percent of Catch	0.0	32.0	7.8	0.0	39.9
	Number of Samples	0	49	12	0	61
Female	Percent of Catch	0.0	51.6	7.8	0.7	60.1
	Number of Samples	0	79	12	1	92
Total	Percent of Catch	0.0	83.7	15.7	0.7	100.0
	Number of Samples	0	128	24	1	153
Sampling Dates:		7/23-7/30				
Sample Size:		143				
Male	Percent of Catch	0.0	35.0	4.9	2.1	42.0
	Number of Samples	0	50	7	3	60
Female	Percent of Catch	0.0	50.3	7.7	0.0	58.0
	Number of Samples	0	72	11	0	83
Total	Percent of Catch	0.0	85.3	12.6	2.1	100.0
	Number of Samples	0	122	18	3	143
Sampling Dates:		7/31-8/07				
Sample Size:		135				
Male	Percent of Catch	0.0	42.2	6.7	0.7	49.6
	Number of Samples	0	57	9	1	67
Female	Percent of Catch	0.0	43.0	7.4	0.0	50.4
	Number of Samples	0	58	10	0	68
Total	Percent of Catch	0.0	85.2	14.1	0.7	100.0
	Number of Samples	0	115	19	1	135
Sampling Dates:		8/08-8/15				
Sample Size:		150				
Male	Percent of Catch	0.7	47.3	8.7	0.0	56.7
	Number of Samples	1	71	13	0	85
Female	Percent of Catch	0.0	37.3	6.0	0.0	43.3
	Number of Samples	0	56	9	0	65
Total	Percent of Catch	0.7	84.7	14.7	0.0	100.0
	Number of Samples	1	127	22	0	150
Sampling Dates:		7/07-8/15				
Sample Size:		581				
		Season Total				Total
		0.2	0.3	0.4	0.5	
Male	Percent of Catch	0.2	39.1	7.1	0.7	47.0
	Number of Samples	1	227	41	4	273
Female	Percent of Catch	0.0	45.6	7.2	0.2	53.0
	Number of Samples	0	265	42	1	308
Total	Percent of Catch	0.2	84.7	14.3	0.9	100.0
	Number of Samples	1	492	83	5	581

Table 4.—Length by age and sex of Kobuk River chum salmon test fish catch samples, 2005.

		Brood Year and Age Group				Total
		2002 0.2	2001 0.3	2000 0.4	1999 0.5	
Sampling Dates:		7/07-7/22				
Sample Size:		153				
Male	Number of Samples	0	49	12	0	61
	Average Length (mm)		632.4	644.2		634.8
Female	Number of Samples	0	79	12	1	92
	Average Length (mm)		586.9	605.1	630.0	589.7
Sampling Dates:		7/23-7/30				
Sample Size:		143				
Male	Number of Samples	0	50	7	3	60
	Average Length (mm)		627.7	652.1	636.7	631.0
Female	Number of Samples	0	72	11	0	83
	Average Length (mm)		589.7	605.5		591.8
Sampling Dates:		7/31-8/07				
Sample Size:		135				
Male	Number of Samples	0	57	9	1	67
	Average Length (mm)		625.2	640.0	645.0	627.5
Female	Number of Samples	0	58	10	0	68
	Average Length (mm)		593.4	606.0		595.2
Sampling Dates:		8/08-8/15				
Sample Size:		150				
Male	Number of Samples	1	71	13	0	85
	Average Length (mm)	575.0	609.6	637.3		613.4
Female	Number of Samples	0	56	9	0	65
	Average Length (mm)		585.9	595.6		587.2
Sampling Dates:		7/07-8/15				
Sample Size:		581				
		Season Total				
Male	Number of Samples	1	227	41	4	273
	Average Length (mm)	575.0	622.4	642.4	638.8	625.5
Female	Number of Samples	0	265	42	1	308
	Average Length (mm)		588.8	603.4	630.0	591.0

Table 5.—Noatak River age and sex composition of chum salmon test fish catch samples, 2005.

		Brood Year and Age Group				Total
		2002 0.2	2001 0.3	2000 0.4	1999 0.5	
Sampling Dates: 8/03						
Sample Size: 30						
Male	Percent of Catch	0.0	40.0	6.7	0.0	46.7
	Number of Samples	0	12	2	0	14
Female	Percent of Catch	0.0	36.7	16.7	0.0	53.3
	Number of Samples	0	11	5	0	16
Total	Percent of Catch	0.0	76.7	23.3	0.0	100.0
	Number of Samples	0	23	7	0	30
Sampling Date: 8/11						
Sample Size: 180						
Male	Percent of Catch	0.0	45.0	3.3	1.7	50.0
	Number of Samples	0	81	6	3	90
Female	Percent of Catch	0.0	45.6	4.4	0.0	50.0
	Number of Samples	0	82	8	0	90
Total	Percent of Catch	0.0	90.6	7.8	1.7	100.0
	Number of Samples	0	163	14	3	180
Sampling Date: 8/16						
Sample Size: 66						
Male	Percent of Catch	1.5	37.9	4.5	0.0	43.9
	Number of Samples	1	25	3	0	29
Female	Percent of Catch	1.5	51.5	3.0	0.0	56.1
	Number of Samples	1	34	2	0	37
Total	Percent of Catch	3.0	89.4	7.6	0.0	100.0
	Number of Samples	2	59	5	0	66
Sampling Dates: 8/03-8/16						
Sample Size: 276						
		Season Total				
Male	Percent of Catch	0.4	42.8	4.0	1.1	48.2
	Number of Samples	1	118	11	3	133
Female	Percent of Catch	0.4	46.0	5.4	0.0	51.8
	Number of Samples	1	127	15	0	143
Total	Percent of Catch	0.7	88.8	9.4	1.1	100.0
	Number of Samples	2	245	26	3	276

Table 6.—Length by age and sex of Noatak River chum salmon test fish catch samples, 2005.

		Brood Year and Age Group				Total
		2002	2001	2000	1999	
		0.2	0.3	0.4	0.5	
Sampling Dates:		8/03				
Sample Size:		30				
Male	Number of Samples	0	12	2	0	14
	Average Length (mm)		626.3	650.0		629.6
Female	Number of Samples	0	11	5	0	16
	Average Length (mm)		575.5	610.0		586.3
Sampling Date:		8/11				
Sample Size:		180				
Male	Number of Samples	0	81	6	3	90
	Average Length (mm)		605.1	598.8	610.0	604.8
Female	Number of Samples	0	82	8	0	90
	Average Length (mm)		590.0	595.5		597.6
Sampling Date:		8/16				
Sample Size:		66				
Male	Number of Samples	1	25	3	0	29
	Average Length (mm)	555.0	629.0	649.3		628.7
Female	Number of Samples	1	34	2	0	37
	Average Length (mm)	560.0	596.4	622.5		596.6
Sampling Dates:		8/03-8/16				
Sample Size:		276				
		Season Total				
Male	Number of Samples	1	118	11	3	133
	Average Length (mm)	555.0	612.3	621.9	610.0	612.6
Female	Number of Samples	1	127	15	0	143
	Average Length (mm)	560.0	590.4	603.9		596.1

Table 7.—Commercial chum salmon catch samples age and sex composition, Kotzebue Sound, 2005.

		Brood Year and Age Group				Total
		2002 0.2	2001 0.3	2000 0.4	1999 0.5	
Sampling Dates: 7/11-7/17						
Sample Size: 293						
Male	Percent of Catch	0.3	40.6	11.6	0.3	52.9
	Number of Samples	1	119	34	1	155
Female	Percent of Catch	1.0	41.6	4.4	0.0	47.1
	Number of Samples	3	122	13	0	138
Total	Percent of Catch	1.4	82.3	16.0	0.3	100.0
	Number of Samples	4	241	47	1	293
Sampling Dates: 7/18-7/24						
Sample Size: 308						
Male	Percent of Catch	0.0	29.9	3.6	0.3	33.8
	Number of Samples	0	92	11	1	104
Female	Percent of Catch	0.6	59.1	5.5	1.0	66.2
	Number of Samples	2	182	17	3	204
Total	Percent of Catch	0.6	89.0	9.1	1.3	100.0
	Number of Samples	2	274	28	4	308
Sampling Dates: 7/25-7/31						
Sample Size: 279						
Male	Percent of Catch	0.0	36.9	6.5	0.0	43.4
	Number of Samples	0	103	18	0	121
Female	Percent of Catch	1.1	47.3	7.9	0.4	56.6
	Number of Samples	3	132	22	1	158
Total	Percent of Catch	1.1	84.2	14.3	0.4	100.0
	Number of Samples	3	235	40	1	279
Sampling Dates: 8/01-8/07						
Sample Size: 332						
Male	Percent of Catch	0.3	40.7	5.4	0.3	46.7
	Number of Samples	1	135	18	1	155
Female	Percent of Catch	0.0	46.7	6.6	0.0	53.3
	Number of Samples	0	155	22	0	177
Total	Percent of Catch	0.3	87.3	12.0	0.3	100.0
	Number of Samples	1	290	40	1	332

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Table 7.–Page 2 of 2.

		Brood Year and Age Group				Total
		2002 0.2	2001 0.3	2000 0.4	1999 0.5	
Sampling Dates: 8/08-8/14						
Sample Size: 339						
Male	Percent of Catch	0.6	44.5	4.1	0.0	49.3
	Number of Samples	2	151	14	0	167
Female	Percent of Catch	0.9	45.7	3.8	0.3	50.7
	Number of Samples	3	155	13	1	172
Total	Percent of Catch	1.5	90.3	8.0	0.3	100.0
	Number of Samples	5	306	27	1	339
Sampling Dates: 8/15-8/21						
Sample Size: 391						
Male	Percent of Catch	1.5	43.7	5.6	0.3	51.2
	Number of Samples	6	171	22	1	200
Female	Percent of Catch	0.8	44.0	3.6	0.5	48.8
	Number of Samples	3	172	14	2	191
Total	Percent of Catch	2.3	87.7	9.2	0.8	100.0
	Number of Samples	9	343	36	3	391
Sampling Dates: 8/22						
Sample Size: 157						
Male	Percent of Catch	1.9	31.2	2.5	0.0	35.7
	Number of Samples	3	49	4	0	56
Female	Percent of Catch	1.3	59.2	3.8	0.0	64.3
	Number of Samples	2	93	6	0	101
Total	Percent of Catch	3.2	90.4	6.4	0.0	100.0
	Number of Samples	5	142	10	0	157
Sampling Dates: 7/11-8/22						
Sample Size: 2,099						
		Season Total				
Male	Percent of Catch	0.6	39.1	5.8	0.2	45.6
	Number of Samples	13	820	121	4	958
Female	Percent of Catch	0.8	48.2	5.1	0.3	54.4
	Number of Samples	16	1,011	107	7	1141
Total	Percent of Catch	1.4	87.2	10.9	0.5	100.0
	Number of Samples	29	1,831	228	11	2,099

Table 8.—Length by age and sex of Kotzebue commercial chum salmon catch samples, Kotzebue Sound, 2005.

		Brood Year and Age Group				Total
		2002 0.2	2001 0.3	2000 0.4	1999 0.5	
Sampling Dates: 7/11-7/17						
Sample Size: 293						
Male	Number of Samples	1	119	34	1	155
	Average Length (mm)	580.0	614.6	639.4	610.0	619.8
Female	Number of Samples	3	122	13	0	138
	Average Length (mm)	578.3	597.2	615.4		598.5
Sampling Dates: 7/18-7/24						
Sample Size: 308						
Male	Number of Samples	0	92	11	1	104
Female	Number of Samples	2	182	17	3	204
	Average Length (mm)	572.5	588.8	605.6	600.0	590.2
Sampling Dates: 7/25-7/31						
Sample Size: 279						
Male	Number of Samples	0	103	18	0	121
	Average Length (mm)		629.9	645.6		632.2
Female	Number of Samples	3	132	22	1	158
	Average Length (mm)	578.3	601.7	615.5	610.0	603.3
Sampling Dates: 8/01-8/07						
Sample Size: 332						
Male	Number of Samples	1	135	18	1	155
	Average Length (mm)	540.0	617.2	631.1	580.0	618.1
Female	Number of Samples	0	155	22	0	177
	Average Length (mm)		592.3	603.4		593.6

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Table 8.–Page 2 of 2.

		Brood Year and Age Group				Total
		2002	2001	2000	1999	
		0.2	0.3	0.4	0.5	
Sampling Dates:		8/08-8/14				
Sample Size:		339				
Male	Number of Samples	2	151	14	0	167
	Average Length (mm)	565.0	613.2	630.4		614.0
Female	Number of Samples	3	155	13	1	172
	Average Length (mm)	540.0	589.5	595.0	620.0	589.2
Sampling Dates:		8/15-8/21				
Sample Size:		391				
Male	Number of Samples	6	171	22	1	200
	Average Length (mm)	586.7	614.0	635.5	670.0	615.8
Female	Number of Samples	3	172	14	2	191
	Average Length (mm)	585.0	583.8	601.1	620.0	585.4
Sampling Dates:		8/22				
Sample Size:		157				
Male	Number of Samples	3	49	4	0	56
	Average Length (mm)	553.3	613.9	630.0		611.8
Female	Number of Samples	2	93	6	0	101
	Average Length (mm)	587.5	590.1	593.3		590.2
Sampling Dates:		7/11-8/22				
Sample Size:		2,099				
		Season Total				
Male	Number of Samples	13	820	121	4	958
	Average Length (mm)	571.5	616.3	637.7	610.0	618.7
Female	Number of Samples	16	1,011	107	7	1,141
	Average Length (mm)	572.8	591.4	605.8	610.0	592.6
Total	Number of Samples	29	1,831	228	11	2,099
	Average Length (mm)	572.2	602.1	622.7	611.8	604.5

Table 9.–Kobuk River atmospheric and hydrologic data, 2005.

Date	Water Temp. (C)	Water Gauge (inches) ^a	Secchi (meters)	Percent Cloud Cover	Observer Comments
7/12		3.0	4.0	100	rain
7/13	12.0	2.0	3.5	100	rain
7/14	13.0	5.0	3.0	100	rain
7/15	11.0	12.0	2.5	75	mist
7/16	13.0	21.0	3.0	0	clear
7/17	13.0	22.0	1.5	100	rain
7/18	13.0	19.0	2.0	0	clear
7/19	14.0	15.0	2.0	100	rain
7/20	15.0	11.0	2.5	100	cloudy
7/21	15.0	9.0	3.0	0	clear
7/22	16.0	3.0	3.0	0	clear
7/23	16.0	-1.0	3.0	0	clear
7/24	16.0	-2.0	3.5	0	clear
7/25	17.0	-6.0	3.0	75	smoke
7/26	17.0	-8.0	3.0	75	smoke
7/27	17.0	-11.0	3.6	50	smoke
7/28	17.0	-13.0	3.0	50	smoke
7/29	17.0	-12.0	3.5	50	fog
7/30	17.0	-12.0	4.0	0	clear
7/31	17.0	-14.0	3.6	0	clear
8/01	17.0	-15.0	3.6	75	smoke
8/02	16.0	-17.0	3.6	0	smoke
8/03	16.0	-18.0	4.0	0	fog
8/04	16.0	-20.0	4.5	100	fog
8/05	16.0	-18.0	4.5	100	rain
8/06	14.5	-14.0	4.0	100	rain
8/07	13.5	-16.0	2.5	100	windy SW 20
8/08	13.0	-8.0	3.5	90	calm
8/09	13.0	0.0	2.0	0	smoke
8/10	14.0	-0.5	3.5	100	very smoky
8/11	14.5	-1.0	3.0	100	light wind
8/12	14.0	-6.0	3.5	75	calm
8/13	14.0	-8.0	4.0	100	very smoky
8/14	14.0	-8.5	4.0	0	light smoke
8/15	15.0	-11.0	4.5	0	smoky

^a The gauge is set even (0.0 inches) with the water level at the start of season.

Table 10.—Kobuk River test fish sheefish CPUE by day, drift, and site, 2005.

Date	CPUE by Drift ^a			CPUE by Site ^b		Daily CPUE	Cum. CPUE
	#1 ^c	#2	#3	N	S		
7/07			11.43	9.23	13.58	11.43	11.43
7/08							11.43
7/09							11.43
7/10							11.43
7/11	25.88	2.31	13.71	12.31	15.48	13.89	25.32
7/12	16.15	11.65	21.18	6.27	26.15	16.31	41.63
7/13	13.85	18.64	18.82	1.57	32.31	17.09	58.72
7/14	22.43	27.96	20.19	3.14	42.44	23.47	82.19
7/15	20.77	18.29	13.71	9.41	25.34	17.58	99.77
7/16	24.67	27.43	22.98	13.15	36.00	25.10	124.87
7/17	15.27	18.46	15.00	14.55	17.89	16.20	141.07
7/18	18.46	18.82	8.81	12.63	17.67	15.24	156.31
7/19	10.53	13.71	8.89	7.50	14.37	11.01	167.32
7/20	8.97	6.92	9.06	10.77	5.96	8.33	175.65
7/21	13.33	22.76	15.85	9.00	25.41	17.45	193.10
7/22	18.29	16.00	4.44	4.62	20.74	12.83	205.93
7/23	13.71	7.74	13.21	1.76	26.42	12.73	218.66
7/24	13.33	11.54	0	7.89	8.47	8.20	226.86
7/25	2.31	0	0	0	1.49	0.76	227.62
7/26	9.23	8.89	6.73	4.68	11.64	8.28	235.90
7/27	9.32	4.36	4.66	4.68	7.41	6.08	241.98
7/28	4.71	7.06	2.31	4.71	4.65	4.68	246.66
7/29	0	0	0	0	0	0	246.66
7/30	2.33	2.26	2.12	1.48	3.00	2.24	248.90
7/31	4.53	5.85	0	1.92	5.76	3.84	252.74
8/01	2.38	2.93	3.87	0	5.90	2.94	255.68
8/02	0	2.73	2.82	0	5.27	2.11	257.79
8/03	11.76	9.41	7.13	6.36	12.47	9.44	267.23
8/04	3.08			0	8.00	3.08	270.31
8/05	0	8.35	0	4.71	1.49	3.06	273.37
8/06	0	2.24	2.40	3.18	0	1.56	274.93
8/07			4.53	9.06	0	4.53	279.46
8/08	11.65	0	13.64	16.22	0	8.08	287.54
8/09	0	10.11	13.79	11.51	3.53	7.66	295.20
8/10	11.88	2.79	5.58	11.59	1.88	7.03	302.23
8/11	0	0	0	0	0	0	302.23
8/12	0	0	2.86	1.83	0	0.93	303.16
8/13	5.45	2.79	0	3.58	1.80	2.70	305.86
8/14	0	2.64	0	0	1.75	0.90	306.76
8/15	0	0	0	0	0	0	306.76
Total	314.27	294.64	269.72	209.31	404.27	306.76	

^a Catch per unit of effort (CPUE) is calculated in catch/100 fathoms of net/hour.

^b Site N is the north bank (right bank when facing downstream) and site S is the south bank (left bank).

^c Drift 1 begins at 0800 hours, drift 2 at 1500 hours, and drift 3 at 2200 hours.

Table 11.—Kobuk River test fish sheefish CPUE indices, mean CPUE, and percent by drift and site, 2005.

Drift Period	Season CPUE Indices	No. of Period Drifts^a	Season Mean CPUE	Percent	Station	Season CPUE Indices	No. of Site Drifts	Season Mean CPUE	Percent
1 0800 hr.	314.27	35	8.98	35.72	N North Bank	209.31	105	1.99	33.46
2 1500 hr.	294.64	34	8.67	34.47	S South Bank	404.27	102	3.96	66.54
3 2200 hr.	269.72	36	7.49	29.81					
Total	878.63	105		100.00	Total	613.58	207		100.00

^a One drift period is equal to one test fish drift on the north bank and one test fish drift on the south bank. However, during the season, one drift was missed on the south bank during periods 1, 2, and 3 because of motor problems.

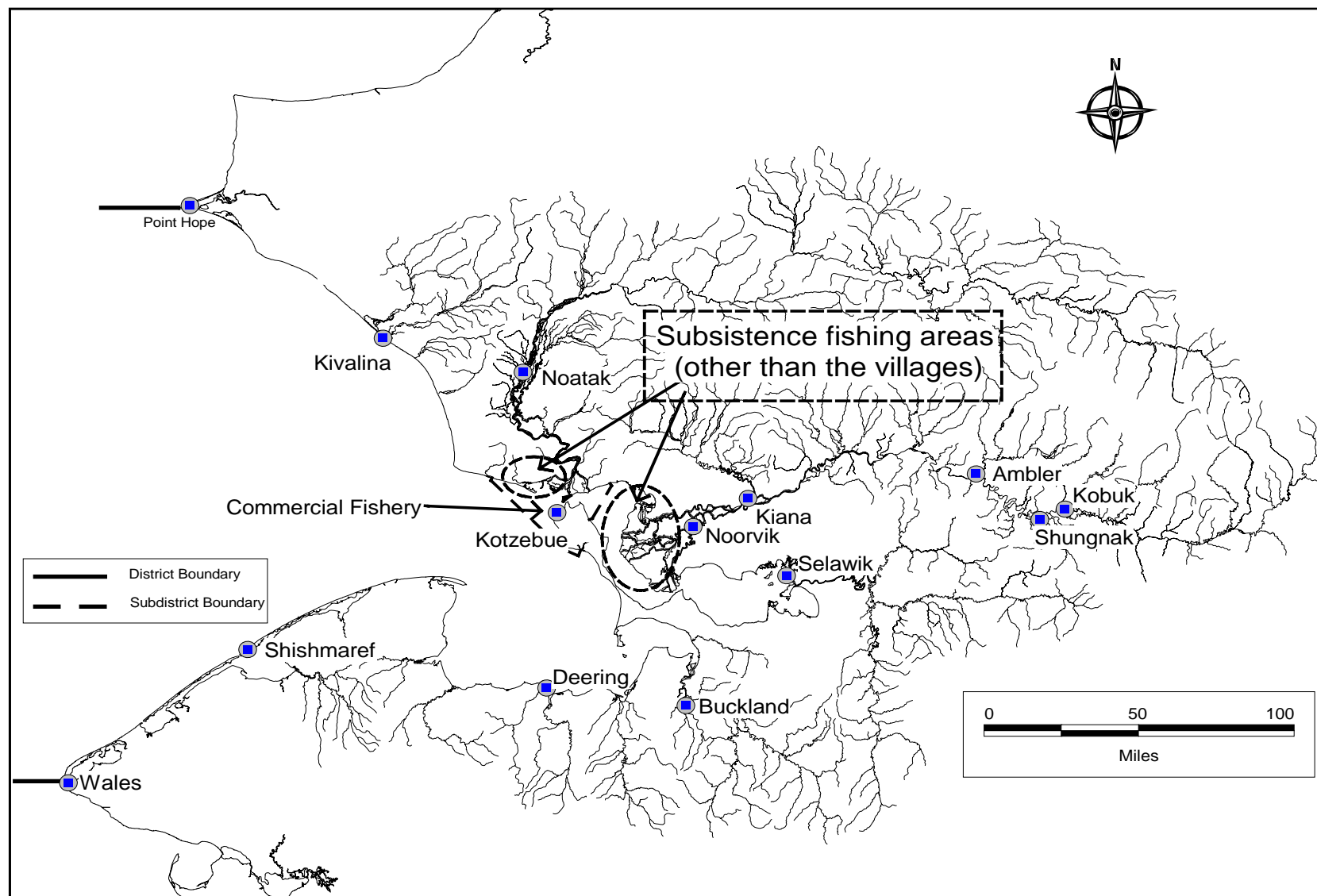


Figure 1.—Kotzebue Sound commercial fishing district, villages and subsistence fishing areas.

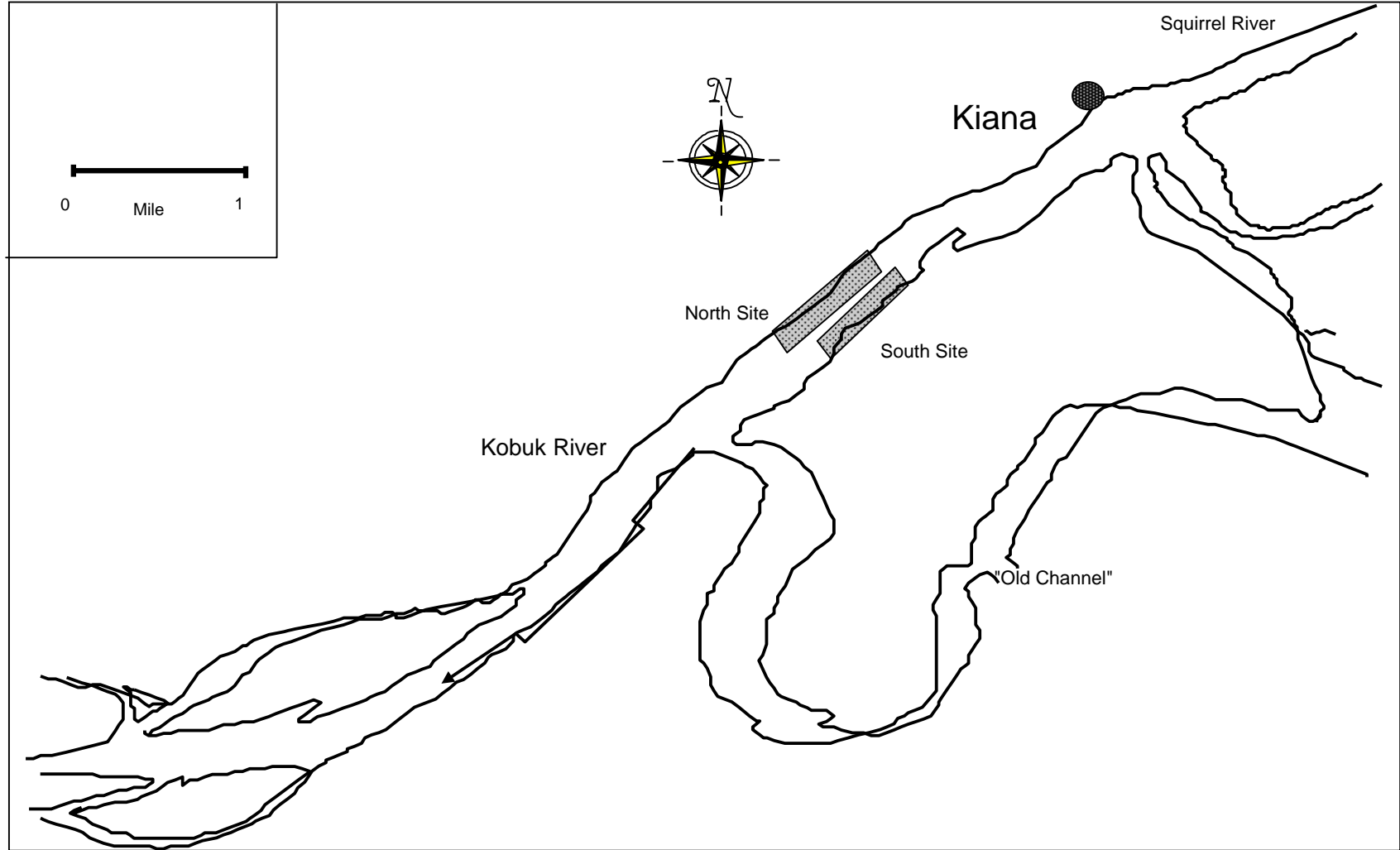


Figure 2.—Kobuk River test fishing sites.

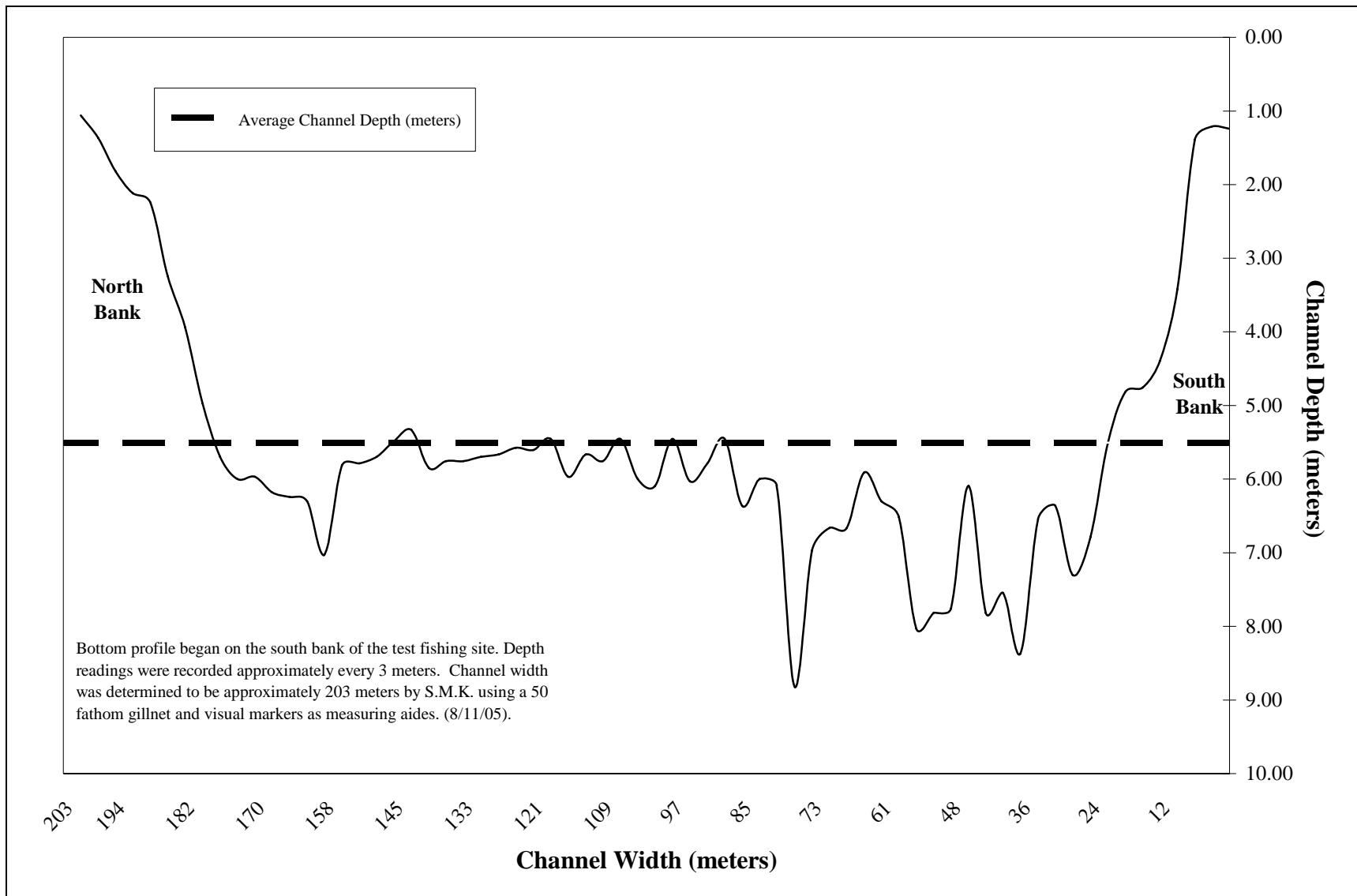


Figure 3.—Kobuk River test fishing site bottom profile, 2005.

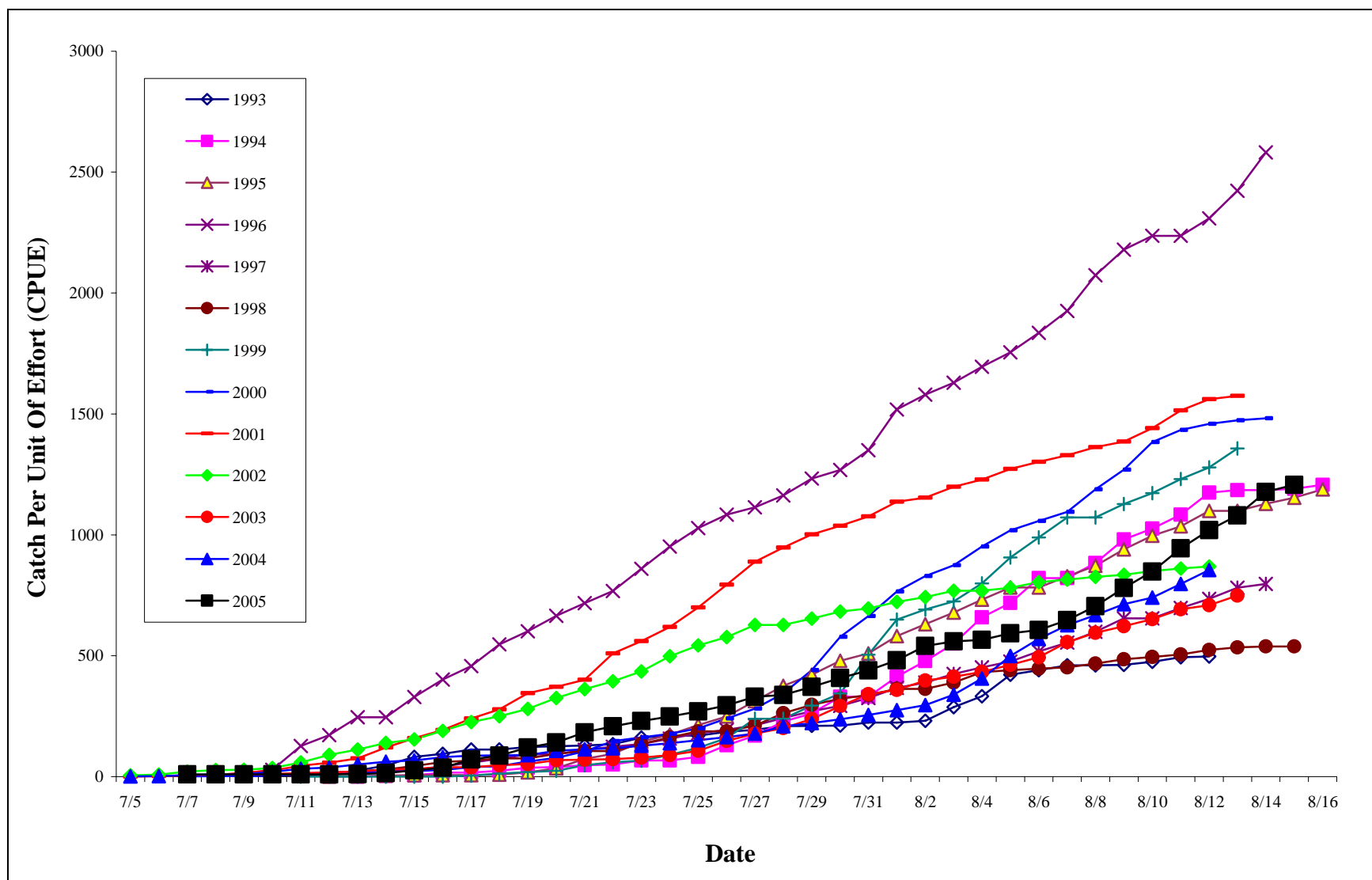


Figure 4.—Kobuk River chum salmon test fish cumulative CPUE, 1993–2005.

APPENDIX A. CATCH PER UNIT EFFORT

Appendix A1.—Kobuk River chum salmon test fish mean daily and cumulative CPUE, 1993–1997.

Date	1993		1994		1995		1996		1997	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/08										
7/09							12.77	12.77	5.85	5.85
7/10							15.00	27.77	0	5.85
7/11							98.38	126.15	5.31	11.16
7/12	11.18	11.18			0	0	45.54	171.69	7.19	18.35
7/13	14.22	25.40	0	0	0.93	0.93	74.29	245.98	^a	18.35
7/14	20.57	45.97	2.68	2.68	2.80	3.73	^a	245.98	6.25	24.60
7/15	35.08	81.05	2.58	5.26	2.77	6.50	83.75	329.73	3.65	28.25
7/16	13.19	94.24	11.35	16.61	^a	6.50	71.35	401.08	14.28	42.53
7/17	17.27	111.51	^a	16.61	0	6.50	55.49	456.57	15.17	57.70
7/18	^a	111.51	7.16	23.77	1.81	8.31	89.86	546.43	16.12	73.82
7/19	10.71	122.22	12.40	36.17	9.89	18.20	54.74	601.17	17.98	91.80
7/20	2.76	124.98	3.65	39.82	16.30	34.50	63.70	664.87	^a	91.80
7/21	3.20	128.18	7.30	47.12	38.54	73.04	52.12	716.99	18.53	110.33
7/22	5.52	133.70	3.56	50.68	21.18	94.22	50.97	767.96	13.28	123.61
7/23	27.15	160.85	16.49	67.17	50.58	144.80	91.36	859.32	10.79	134.40
7/24	9.06	169.91	^a	67.17	28.46	173.26	91.89	951.21	22.86	157.26
7/25	^a	169.91	14.38	81.55	40.16	213.42	76.80	1,028.01	21.57	178.83
7/26	15.22	185.13	47.65	129.20	35.15	248.57	55.68	1,083.69	14.66	193.49
7/27	8.06	193.19	40.66	169.86	63.94	312.51	29.79	1,113.48	18.46	211.95
7/28	16.36	209.55	57.83	227.69	62.49	375.00	49.06	1,162.54	30.53	242.48
7/29	0.93	210.48	33.62	261.31	46.11	421.11	70.13	1,232.67	28.13	270.61
7/30	0.92	211.40	69.21	330.52	57.86	478.97	35.29	1,267.96	22.33	292.94
7/31	12.58	223.98	^a	330.52	29.89	508.86	82.27	1,350.23	32.57	325.51
8/01	^a	223.98	82.16	412.68	72.91	581.77	167.67	1,517.90	41.41	366.92
8/02	6.74	230.72	65.12	477.80	48.71	630.48	62.02	1,579.92	22.41	389.33
8/03	57.08	287.80	71.79	549.59	48.40	678.88	48.70	1,628.62	35.21	424.54
8/04	44.23	332.03	108.98	658.57	53.00	731.88	65.93	1,694.55	26.67	451.21
8/05	89.30	421.33	59.74	718.31	49.95	781.83	60.33	1,754.88	24.47	475.68
8/06	18.60	439.93	102.56	820.87	^a	781.83	80.47	1,835.35	42.25	517.93
8/07	20.52	460.45	^a	820.87	46.39	828.22	90.99	1,926.34	36.00	553.93
8/08	^a	460.45	62.75	883.62	44.02	872.24	146.94	2,073.28	45.07	599.00
8/09	1.84	462.29	96.86	980.48	68.22	940.46	106.11	2,179.39	55.14	654.14
8/10	12.63	474.92	45.83	1,026.31	56.33	996.79	56.95	2,236.34	^a	654.14
8/11	18.11	493.03	57.02	1,083.33	37.95	1,034.74	^a	2,236.34	43.75	697.89
8/12	3.74	496.77	90.54	1,173.87	63.92	1,098.66	72.29	2,308.63	37.36	735.25
8/13			11.36	1,185.23	^a	1,098.66	114.63	2,423.26	45.93	781.18
8/14			^a	1,185.23	29.35	1,128.01	158.13	2,581.39	16.01	797.19
8/15			5.13	1,190.36	25.26	1,153.27				
8/16			16.23	1,206.59	35.04	1,188.31				
8/17			0	1,206.59						
8/18			0	1,206.59						
8/19			3.12	1,209.71						
8/20			0	1,209.71						
8/21			^a	1,209.71						
8/22			0	1,209.71						
8/23			0	1,209.71						
8/24			0	1,209.71						
8/25			0.91	1,210.62						
8/26			5.56	1,216.18						
8/27			1.86	1,218.04						
8/28			0.93	1,218.97						
8/29			0	1,218.97						
8/30			0	1,218.97						

Note: Days with no data indicate days when the project was not operational.

^a Regular day off.

Appendix A2.—Kobuk River chum salmon test fish mean daily and cumulative CPUE, 1998–2002.

Date	1998		1999		2000		2001		2002	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/05							0	0	5.00	5.00
7/06							2.59	2.59	3.39	8.39
7/07					1.28	1.28	2.44	5.03	12.50	20.89
7/08					0.83	2.11	0.83	5.86	5.98	26.87
7/09					0	2.11	10.72	16.58	1.70	28.57
7/10	5.22	5.22			2.50	4.61	8.39	24.97	6.83	35.40
7/11	0.85	6.07	0	0	3.44	8.05	20.07	45.04	22.86	58.26
7/12	^a	6.07	0	0	3.45	11.50	12.63	57.67	31.54	89.80
7/13	15.89	21.96	0	0	2.54	14.04	17.32	74.99	21.67	111.47
7/14	7.53	29.49	0	0	8.57	22.61	45.57	120.56	28.05	139.52
7/15	14.07	43.56	0	0	0.87	23.48	38.86	159.42	14.27	153.79
7/16	17.33	60.89	0	0	3.38	26.86	32.80	192.22	35.27	189.06
7/17	5.07	65.96	4.26	4.26	12.77	39.63	48.77	240.99	36.50	225.56
7/18	9.02	74.98	8.48	12.74	3.58	43.21	36.98	277.97	24.41	249.97
7/19	^a	74.98	5.89	18.63	19.51	62.72	67.08	345.05	30.30	280.27
7/20	18.66	93.64	5.11	23.74	14.57	77.29	26.05	371.10	44.91	325.18
7/21	11.87	105.51	23.75	47.49	27.69	104.98	29.51	400.61	36.30	361.48
7/22	0	105.51	11.91	59.40	41.00	145.98	108.97	509.58	33.08	394.56
7/23	29.58	135.09	6.09	65.49	16.29	162.27	50.79	560.37	40.00	434.56
7/24	27.33	162.42	24.95	90.44	14.62	176.89	58.96	619.33	62.76	497.32
7/25	24.68	187.10	28.73	119.17	22.98	199.87	80.59	699.92	45.64	542.96
7/26	^a	187.10	39.72	158.89	40.28	240.15	94.06	793.98	34.29	577.25
7/27	23.91	211.01	80.39	239.28	41.52	281.67	95.06	889.04	50.41	627.66
7/28	51.91	262.92	^a	239.28	62.34	344.01	58.24	947.28	^a	627.66
7/29	34.16	297.08	55.00	294.28	96.00	440.01	54.33	1,001.61	25.74	653.40
7/30	24.59	321.67	49.66	343.94	138.20	578.21	35.36	1,036.97	28.90	682.30
7/31	15.69	337.36	160.53	504.47	85.87	664.08	38.63	1,075.60	12.68	694.98
8/01	25.44	362.80	145.02	649.49	101.16	765.24	61.50	1,137.10	27.85	722.83
8/02	^a	362.80	41.67	691.16	64.37	829.61	16.55	1,153.65	19.93	742.76
8/03	26.67	389.47	33.19	724.35	44.32	873.93	44.21	1,197.86	25.31	768.07
8/04	42.35	431.82	74.23	798.58	77.14	951.07	30.71	1,228.57	^a	768.07
8/05	8.57	440.39	108.04	906.62	67.26	1,018.33	43.64	1,272.21	12.86	780.93
8/06	6.00	446.39	82.79	989.41	38.92	1,057.25	30.00	1,302.21	23.05	803.98
8/07	5.11	451.50	82.73	1,072.14	37.50	1,094.75	26.31	1,328.52	10.18	814.16
8/08	16.40	467.90	^a	1,072.14	93.37	1,188.12	34.40	1,362.92	11.96	826.12
8/09	17.20	485.10	55.58	1,127.72	81.50	1,269.62	23.01	1,385.93	8.60	834.72
8/10	9.46	494.56	44.73	1,172.45	113.87	1,383.49	54.88	1,440.81	15.27	849.99
8/11	10.29	504.85	58.13	1,230.58	50.57	1,434.06	73.64	1,514.45	11.10	861.09
8/12	19.44	524.29	48.50	1,279.08	24.86	1,458.92	47.23	1,561.68	7.66	868.75
8/13	10.21	534.50	78.37	1,357.45	14.57	1,473.49	13.04	1,574.72		
8/14	3.85	538.35			7.83	1,481.32				
8/15	0	538.35								
8/16										
8/17										
8/18										
8/19										
8/20										
8/21										
8/22										
8/23										
8/24										
8/25										
8/26										
8/27										

Note: Days with no data indicate days when the project was not operational.

^a Regular day off.

Appendix A3.—Kobuk River chum salmon test fish mean daily and cumulative CPUE, 2003–2005.

Date	2003		2004		2005	
	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/02			0	0		
7/03			0.78	0.78		
7/04			0.78	1.56		
7/05			0	1.56		
7/06			0.77	2.33		
7/07			3.80	6.13	9.14	9.14
7/08			1.54	7.67	a	9.14
7/09	7.57	7.57	2.31	9.98	a	9.14
7/10	3.64	11.21	9.95	19.93	a	9.14
7/11	3.76	14.97	12.00	31.93	0	9.14
7/12	2.20	17.17	6.10	38.03	0	9.14
7/13	5.19	22.36	11.89	49.92	1.55	10.69
7/14	6.06	28.42	11.32	61.24	3.79	14.48
7/15	4.49	32.91	6.15	67.39	11.46	25.94
7/16	5.33	38.24	12.75	80.14	10.20	36.14
7/17	0.00	38.24	6.15	86.29	35.34	71.48
7/18	8.83	47.07	1.53	87.82	15.24	86.72
7/19	5.37	52.44	1.53	89.35	33.76	120.48
7/20	15.14	67.58	17.30	106.65	20.44	140.92
7/21	2.23	69.81	6.10	112.75	42.18	183.10
7/22	2.20	72.01	4.46	117.21	24.91	208.01
7/23	5.93	77.94	10.57	127.78	21.55	229.56
7/24	11.01	88.95	9.87	137.65	19.38	248.94
7/25	17.30	106.25	12.87	150.52	20.64	269.58
7/26	41.36	147.61	12.95	163.47	25.58	295.16
7/27	29.65	177.26	14.62	178.09	34.94	330.10
7/28	23.41	200.67	29.82	207.91	7.79	337.89
7/29	37.89	238.56	13.80	221.71	33.00	370.89
7/30	53.63	292.19	15.80	237.51	37.27	408.16
7/31	48.54	340.73	18.00	255.51	30.72	438.88
8/01	17.94	358.67	19.75	275.26	42.12	481.00
8/02	38.62	397.29	20.84	296.10	60.00	541.00
8/03	15.41	412.70	43.09	339.19	18.89	559.89
8/04	20.12	432.82	66.08	405.27	6.15	566.04
8/05	29.14	461.96	93.54	498.81	26.75	592.79
8/06	31.21	493.17	71.20	570.01	14.07	606.86
8/07	62.81	555.98	56.59	626.60	40.75	647.61
8/08	39.29	595.27	41.18	667.78	57.37	704.98
8/09	27.24	622.51	45.54	713.32	74.89	779.87
8/10	29.18	651.69	27.13	740.45	68.57	848.44
8/11	40.34	692.03	56.70	797.15	95.28	943.72
8/12	17.04	709.07	57.57	854.72	75.35	1,019.07
8/13	39.79	748.86			61.12	1,080.19
8/14					97.44	1,177.63
8/15					28.92	1,206.55
8/16						
8/17						
8/18						
8/19						
8/20						
8/21						
8/22						
8/23						
8/24						
8/25						
8/26						
8/27						

Note: Days with no data indicate days when the project was not operational.

^a Regular day off.

Appendix A4.—Kobuk River chum salmon test fish mean daily and cumulative CPUE proportions, 1993–1997.

Date	1993		1994		1995		1996		1997	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/08										
7/09							0.005	0.005	0.007	0.007
7/10							0.006	0.011	0.000	0.007
7/11							0.038	0.049	0.007	0.014
7/12	0.023	0.023			0.000	0.000	0.018	0.067	0.009	0.023
7/13	0.029	0.051	0.000	0.000	0.001	0.001	0.029	0.095	^a	0.023
7/14	0.041	0.093	0.002	0.002	0.002	0.003	^a	0.095	0.008	0.031
7/15	0.071	0.163	0.002	0.004	0.002	0.005	0.032	0.128	0.005	0.035
7/16	0.027	0.190	0.009	0.014	^a	0.005	0.028	0.155	0.018	0.053
7/17	0.035	0.224	^a	0.014	0.000	0.005	0.021	0.177	0.019	0.072
7/18	^a	0.224	0.006	0.020	0.002	0.007	0.035	0.212	0.020	0.093
7/19	0.022	0.246	0.010	0.030	0.008	0.015	0.021	0.233	0.023	0.115
7/20	0.006	0.252	0.003	0.033	0.014	0.029	0.025	0.258	^a	0.115
7/21	0.006	0.258	0.006	0.039	0.032	0.061	0.020	0.278	0.023	0.138
7/22	0.011	0.269	0.003	0.042	0.018	0.079	0.020	0.297	0.017	0.155
7/23	0.055	0.324	0.014	0.055	0.043	0.122	0.035	0.333	0.014	0.169
7/24	0.018	0.342	^a	0.055	0.024	0.146	0.036	0.368	0.029	0.197
7/25	^a	0.342	0.012	0.067	0.034	0.180	0.030	0.398	0.027	0.224
7/26	0.031	0.373	0.039	0.106	0.030	0.209	0.022	0.420	0.018	0.243
7/27	0.016	0.389	0.033	0.139	0.054	0.263	0.012	0.431	0.023	0.266
7/28	0.033	0.422	0.047	0.187	0.053	0.316	0.019	0.450	0.038	0.304
7/29	0.002	0.424	0.028	0.214	0.039	0.354	0.027	0.478	0.035	0.339
7/30	0.002	0.426	0.057	0.271	0.049	0.403	0.014	0.491	0.028	0.367
7/31	0.025	0.451	^a	0.271	0.025	0.428	0.032	0.523	0.041	0.408
8/01	^a	0.451	0.067	0.339	0.061	0.490	0.065	0.588	0.052	0.460
8/02	0.014	0.464	0.053	0.392	0.041	0.531	0.024	0.612	0.028	0.488
8/03	0.115	0.579	0.059	0.451	0.041	0.571	0.019	0.631	0.044	0.533
8/04	0.089	0.668	0.089	0.540	0.045	0.616	0.026	0.656	0.033	0.566
8/05	0.180	0.848	0.049	0.589	0.042	0.658	0.023	0.680	0.031	0.597
8/06	0.037	0.886	0.084	0.673	^a	0.658	0.031	0.711	0.053	0.650
8/07	0.041	0.927	^a	0.673	0.039	0.697	0.035	0.746	0.045	0.695
8/08	^a	0.927	0.051	0.725	0.037	0.734	0.057	0.803	0.057	0.751
8/09	0.004	0.931	0.079	0.804	0.057	0.791	0.041	0.844	0.069	0.821
8/10	0.025	0.956	0.038	0.842	0.047	0.839	0.022	0.866	^a	0.821
8/11	0.036	0.992	0.047	0.889	0.032	0.871	^a	0.866	0.055	0.875
8/12	0.008	1.000	0.074	0.963	0.054	0.925	0.028	0.894	0.047	0.922
8/13			0.009	0.972	^a	0.925	0.044	0.939	0.058	0.980
8/14			^a	0.972	0.025	0.949	0.061	1.000	0.020	1.000
8/15			0.004	0.977	0.021	0.971				
8/16			0.013	0.990	0.029	1.000				
8/17			0.000	0.990						
8/18			0.000	0.990						
8/19			0.003	0.992						
8/20			0.000	0.992						
8/21			^a	0.992						
8/22			0.000	0.992						
8/23			0.000	0.992						
8/24			0.000	0.992						
8/25			0.001	0.993						
8/26			0.005	0.998						
8/27			0.002	0.999						
8/28			0.001	1.000						
8/29			0.000	1.000						
8/30			0.000	1.000						

Note: Days with no data indicate days when the project was not operational.

^a Regular day off.

Appendix A5.–Kobuk River chum salmon test fish mean daily and cumulative CPUE proportions, 1998–2002.

Date	1998		1999		2000		2001		2002	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/05							0.000	0.000	0.006	0.006
7/06							0.002	0.002	0.004	0.010
7/07					0.001	0.001	0.002	0.003	0.014	0.024
7/08					0.001	0.001	0.001	0.004	0.007	0.031
7/09					0.000	0.001	0.007	0.011	0.002	0.033
7/10	0.010	0.010			0.002	0.003	0.005	0.016	0.008	0.041
7/11	0.002	0.011	0.000	0.000	0.002	0.005	0.013	0.029	0.026	0.067
7/12	^a	0.011	0.000	0.000	0.002	0.008	0.008	0.037	0.036	0.103
7/13	0.030	0.041	0.000	0.000	0.002	0.009	0.011	0.048	0.025	0.128
7/14	0.014	0.055	0.000	0.000	0.006	0.015	0.029	0.077	0.032	0.161
7/15	0.026	0.081	0.000	0.000	0.001	0.016	0.025	0.101	0.016	0.177
7/16	0.032	0.113	0.000	0.000	0.002	0.018	0.021	0.122	0.041	0.218
7/17	0.009	0.123	0.003	0.003	0.009	0.027	0.031	0.153	0.042	0.260
7/18	0.017	0.139	0.006	0.009	0.002	0.029	0.023	0.177	0.028	0.288
7/19	^a	0.139	0.004	0.014	0.013	0.042	0.043	0.219	0.035	0.323
7/20	0.035	0.174	0.004	0.017	0.010	0.052	0.017	0.236	0.052	0.374
7/21	0.022	0.196	0.017	0.035	0.019	0.071	0.019	0.254	0.042	0.416
7/22	0.000	0.196	0.009	0.044	0.028	0.099	0.069	0.324	0.038	0.454
7/23	0.055	0.251	0.004	0.048	0.011	0.110	0.032	0.356	0.046	0.500
7/24	0.051	0.302	0.018	0.067	0.010	0.119	0.037	0.393	0.072	0.572
7/25	0.046	0.348	0.021	0.088	0.016	0.135	0.051	0.444	0.053	0.625
7/26	^a	0.348	0.029	0.117	0.027	0.162	0.060	0.504	0.039	0.664
7/27	0.044	0.392	0.059	0.176	0.028	0.190	0.060	0.565	0.058	0.722
7/28	0.096	0.488	^a	0.176	0.042	0.232	0.037	0.602	^a	0.722
7/29	0.063	0.552	0.041	0.217	0.065	0.297	0.035	0.636	0.030	0.752
7/30	0.046	0.598	0.037	0.253	0.093	0.390	0.022	0.659	0.033	0.785
7/31	0.029	0.627	0.118	0.372	0.058	0.448	0.025	0.683	0.015	0.800
8/01	0.047	0.674	0.107	0.478	0.068	0.517	0.039	0.722	0.032	0.832
8/02	^a	0.674	0.031	0.509	0.043	0.560	0.011	0.733	0.023	0.855
8/03	0.050	0.723	0.024	0.534	0.030	0.590	0.028	0.761	0.029	0.884
8/04	0.079	0.802	0.055	0.588	0.052	0.642	0.020	0.780	^a	0.884
8/05	0.016	0.818	0.080	0.668	0.045	0.687	0.028	0.808	0.015	0.899
8/06	0.011	0.829	0.061	0.729	0.026	0.714	0.019	0.827	0.027	0.925
8/07	0.009	0.839	0.061	0.790	0.025	0.739	0.017	0.844	0.012	0.937
8/08	0.030	0.869	^a	0.790	0.063	0.802	0.022	0.865	0.014	0.951
8/09	0.032	0.901	0.041	0.831	0.055	0.857	0.015	0.880	0.010	0.961
8/10	0.018	0.919	0.033	0.864	0.077	0.934	0.035	0.915	0.018	0.978
8/11	0.019	0.938	0.043	0.907	0.034	0.968	0.047	0.962	0.013	0.991
8/12	0.036	0.974	0.036	0.942	0.017	0.985	0.030	0.992	0.009	1.000
8/13	0.019	0.993	0.058	1.000	0.010	0.995	0.008	1.000		
8/14	0.007	1.000			0.005	1.000				
8/15	0.000	1.000								
8/16										
8/17										
8/18										
8/19										
8/20										
8/21										
8/22										
8/23										
8/24										
8/25										
8/26										
8/27										

Note: Days with no data indicate days when the project was not operational.

^a Regular day off.

Appendix A6.—Kobuk River chum salmon test fish mean daily and cumulative CPUE proportions, 2003–2005.

Date	2003		2004		2005	
	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/02			0.000	0.000		
7/03			0.001	0.001		
7/04			0.001	0.002		
7/05			0.000	0.002		
7/06			0.001	0.003		
7/07			0.004	0.007	0.008	0.008
7/08			0.002	0.009	0.000	0.008
7/09	0.010	0.010	0.003	0.012	0.000	0.008
7/10	0.005	0.015	0.012	0.023	0.000	0.008
7/11	0.005	0.020	0.014	0.037	0.000	0.008
7/12	0.003	0.023	0.007	0.044	0.000	0.008
7/13	0.007	0.030	0.014	0.058	0.001	0.009
7/14	0.008	0.038	0.013	0.072	0.003	0.012
7/15	0.006	0.044	0.007	0.079	0.009	0.021
7/16	0.007	0.051	0.015	0.094	0.008	0.030
7/17	0.000	0.051	0.007	0.101	0.029	0.059
7/18	0.012	0.063	0.002	0.103	0.013	0.072
7/19	0.007	0.070	0.002	0.105	0.028	0.100
7/20	0.020	0.090	0.020	0.125	0.017	0.117
7/21	0.003	0.093	0.007	0.132	0.035	0.152
7/22	0.003	0.096	0.005	0.137	0.021	0.172
7/23	0.008	0.104	0.012	0.149	0.018	0.190
7/24	0.015	0.119	0.012	0.161	0.016	0.206
7/25	0.023	0.142	0.015	0.176	0.017	0.223
7/26	0.055	0.197	0.015	0.191	0.021	0.245
7/27	0.040	0.237	0.017	0.208	0.029	0.274
7/28	0.031	0.268	0.035	0.243	0.006	0.280
7/29	0.051	0.319	0.016	0.259	0.027	0.307
7/30	0.072	0.390	0.018	0.278	0.031	0.338
7/31	0.065	0.455	0.021	0.299	0.025	0.364
8/01	0.024	0.479	0.023	0.322	0.035	0.399
8/02	0.052	0.531	0.024	0.346	0.050	0.448
8/03	0.021	0.551	0.050	0.397	0.016	0.464
8/04	0.027	0.578	0.077	0.474	0.005	0.469
8/05	0.039	0.617	0.109	0.584	0.022	0.491
8/06	0.042	0.659	0.083	0.667	0.012	0.503
8/07	0.084	0.742	0.066	0.733	0.034	0.537
8/08	0.052	0.795	0.048	0.781	0.048	0.584
8/09	0.036	0.831	0.053	0.835	0.062	0.646
8/10	0.039	0.870	0.032	0.866	0.057	0.703
8/11	0.054	0.924	0.066	0.933	0.079	0.782
8/12	0.023	0.947	0.067	1.000	0.062	0.845
8/13	0.053	1.000			0.051	0.895
8/14					0.081	0.976
8/15					0.024	1.000
8/16						
8/17						
8/18						
8/19						
8/20						
8/21						
8/22						
8/23						
8/24						
8/25						
8/26						
8/27						

Note: Days with no data indicate days when the project was not operational.

Appendix A7.—Kobuk River chum salmon test fish cumulative CPUE comparison, 1993–2005.

Year	Project Operation Dates	Number of test fish drifts	Number of days off inseason^a	Rank by number of drifts	Cumulative CPUE	Rank by cumulative CPUE
1993	7/12-8/12	164	4	13	496.77	13
1994	7/13-8/30	248	6	1	1,218.97	5
1995	7/12-8/16	196	3	10	1,188.31	7
1996	7/09-8/14	208	2	7	2,581.39	1
1997	7/09-8/14	202	3	9	797.19	10
1998	7/10-8/15	182	4	11	538.35	12
1999	7/11-8/13	176	2	12	1,357.45	4
2000	7/07-8/14	228	0	4	1,481.32	3
2001	7/05-8/13	232	0	3	1,574.72	2
2002	7/05-8/12	218	2	5	868.75	8
2003	7/09-8/13	214	0	6	748.86	11
2004	7/02-8/12	242	0	2	854.72	9
2005	7/07-8/15	207	3	8	1,206.55	6

^a Number of days during the season where the crew had the day off and no test fishing occurred.

Appendix A8.—Kobuk River escapement, subsistence, test fish, and Kotzebue commercial chum salmon catch data, 1993–2005.

Year	Date	Drifts	Chum CPUE	Commercial Chum Catch	Subsistence Kobuk River	Total Catch	Kobuk River Escapement ^a
1993	7/12–8/12	164	496.77	73,071	^b	73,071	31,697
1994	7/13–8/30	248	1,218.97	153,452	36,167	189,619	
1995	7/12–8/16	196	1,188.31	290,730	38,972	329,702	64,219
1996	7/09–8/14	208	2,581.39	82,110	40,060	122,170	131,105
1997	7/09–8/14	202	797.19	142,720	27,251	169,971	
1998	7/10–8/15	182	538.35	55,907	21,882	77,789	
1999	7/11–8/13	176	1,357.45	138,605	28,114	166,719	48,748
2000	7/07–8/14	228	1,481.32	159,802	23,518	183,320	
2001	7/05–8/13	232	1,574.72	211,672	29,646 ^c	241,318	
2002	7/05–8/12	218	868.75	8,390	13,943 ^b	22,333	
2003	7/09–8/13	216	748.86	25,763	18,685	44,448	
2004	7/02–8/12	242	854.72	51,038	22,208	73,246	
2005	7/07–8/15	207	1,206.55	75,971	^d		

^a The escapement goal for rivers surveyed in the Kobuk River system is 30,500 chum salmon. Information is not included for years in which there were poor aerial survey conditions, or when no surveys were flown.

^b Several Kobuk River villages were not surveyed in 1993 and 2002.

^c Ambler village was not surveyed in 2001.

^d Subsistence data not yet available.

Appendix A9.—Kobuk River chum salmon test fish time and site distribution expressed as mean CPUE, 1993–2005.

Year	Mean CPUE by Drift Period ^a			Period Yearly Mean CPUE	Percent Mean CPUE by Drift Period			Mean CPUE by Site ^b		Site Yearly Mean CPUE	Percent Mean CPUE by Site	
	1	2	3		1	2	3	N	S		N	S
1993	13.0	21.3	15.9	16.7	25.8	42.5	31.6	3.4	8.5	6.0	28.6	71.4
1994	25.8	33.2	23.7	27.6	31.2	40.1	28.7	1.7	18.6	10.1	8.4	91.6
1995	32.1	37.6	39.9	36.5	29.3	34.3	36.4	8.5	16.2	12.4	34.3	65.7
1996	73.2	81.7	66.5	73.8	33.1	36.9	30.0	13.7	36.4	25.0	27.3	72.7
1997	23.9	23.3	23.6	23.6	33.7	32.9	33.4	4.3	11.4	7.8	27.3	72.7
1998	18.6	19.4	13.1	17.0	36.4	38.1	25.6	2.8	8.6	5.7	24.4	75.6
1999	49.7	38.6	25.4	37.9	43.7	34.0	22.3	5.2	25.5	15.4	17.0	83.0
2000	40.9	36.7	36.1	37.9	35.9	32.3	31.8	9.1	16.3	12.7	35.8	64.2
2001	47.8	34.1	34.8	38.9	41.0	29.2	29.8	8.0	18.4	13.2	30.2	69.8
2002	20.9	26.5	22.9	23.5	29.7	37.7	32.6	4.3	11.0	7.6	28.0	72.0
2003	23.0	20.2	18.4	20.5	37.4	32.8	29.8	3.5	10.1	6.8	25.4	74.6
2004	19.1	24.0	19.3	20.8	30.7	38.4	30.9	4.3	9.5	6.9	30.9	69.1
2005	31.7	33.4	34.7	33.3	31.8	33.4	34.8	10.9	12.4	11.6	46.9	53.1

^a Drift 1 begins at 0800 hours, drift 2 at 1500 hours, and drift 3 at 2200 hours. There are 2 drifts (one on each riverbank) in each drift period.

^b Site N is the north bank and Site S is the south bank. The mean CPUE is the cumulative CPUE for each riverbank for the season divided by the number of drifts on that riverbank during the season.

APPENDIX B. AGE, SEX, AND LENGTH

Appendix B1.—Comparison of age and sex compositions by year for Kobuk River test-net chum salmon catch, 1993–2005.

Year	Date	No. of Samples	Percent by Sex		Percent by Age Group				
			Male	Female	0.2	0.3	0.4	0.5	0.6
1993	7/17–8/12	462	52.6	47.4	1.7	28.8	66.0	3.5	0.0
1994	7/13–8/29	624	63.0	37.0	3.0	58.0	36.6	2.4	0.0
1995	7/13–8/16	1,025	63.3	36.7	2.2	61.5	34.0	2.2	0.0
1996	7/09–8/18	1,633	54.8	45.2	0.5	31.9	58.4	8.9	0.3
1997	7/09–8/14	756	56.2	43.8	1.3	23.9	59.3	15.2	0.3
1998	7/10–8/15	536	43.5	56.5	4.9	51.3	31.0	11.9	0.9
1999	7/17–8/13	913	59.7	40.3	0.4	92.0	5.9	1.4	0.2
2000	7/07–8/14	635	47.1	52.9	1.1	60.9	37.6	0.3	0.0
2001	7/06–8/13	930	42.0	58.0	1.9	36.9	58.6	2.6	0.0
2002	7/05–8/12	793	45.0	55.0	0.1	24.8	67.2	7.8	0.0
2003	7/09–8/13	566	29.2	70.8	1.6	54.2	30.4	13.8	0.0
2004	7/03–8/12	578	47.9	52.1	11.1	47.4	37.5	3.5	0.5
2005	7/07–8/15	581	47.0	53.0	0.2	84.7	14.3	0.9	0.0

Appendix B2.—Comparison of age and sex compositions by year for Kotzebue commercial chum salmon catch, 1993–2005.

Year	Date	No. of Samples	Percent by Sex		Percent by Age Group				
			Male	Female	0.2	0.3	0.4	0.5	0.6
1993	7/09–8/28	1,870	52.3	47.7	1.4	20.4	73.3	4.8	0.2
1994	7/12–8/24	3,614	55.2	44.8	3.3	63.0	30.8	2.9	0.0
1995	7/11–8/28	4,621	51.4	48.6	2.2	58.9	36.9	1.9	0.0
1996	7/08–8/26	2,386	49.6	50.4	0.9	40.7	48.9	9.0	0.4
1997	7/10–8/29	4,824	57.6	42.4	1.4	28.7	58.3	10.2	1.4
1998	7/10–8/30	3,128	57.2	42.8	6.2	50.4	29.3	13.3	0.7
1999	7/13–8/27	3,288	51.3	48.7	0.9	87.5	10.6	0.9	0.2
2000	7/11–8/24	3,179	39.2	60.7	2.1	61.6	35.2	1.0	0.0
2001	7/10–8/24	3,670	41.9	58.1	2.4	45.7	49.9	2.0	0.1
2002 ^a									
2003	7/22–8/19	969	48.9	51.1	0.7	65.6	27.2	6.5	0.0
2004	7/13–8/20	1,472	57.1	42.9	12.8	53.3	32.7	1.0	0.2
2005	7/11–8/22	2,099	45.6	54.4	1.4	87.2	10.9	0.5	0.0

^a No samples taken in 2002 because of lack of a major buyer.

Appendix B3.—Comparison of age and sex compositions by year for Noatak River test fish chum salmon catch, 1993–2005.

Year	Date	No. of Samples	Percent by Sex		Percent by Age Group				
			Male	Female	0.2	0.3	0.4	0.5	0.6
1993	7/24–9/13	956	42.6	57.4	4.8	34.2	58.8	1.8	0.3
1994	7/22–9/10	1,160	47.6	52.6	3.1	68.5	26.8	1.6	0.0
1995	7/20–8/29	1,266	49.2	50.8	2.0	56.1	39.8	1.9	0.2
1996	7/28–8/27	347	45.5	54.5	0.6	47.0	45.5	6.9	0.0
1997	7/27–8/28	214	67.3	32.7	0.5	34.1	56.1	8.9	0.5
1998	7/27–8/28	284	53.1	46.9	5.6	70.1	21.5	2.5	0.3
1999	8/14–8/29	140	52.9	47.1	0.7	80.7	17.1	0.7	0.7
2000 ^a									
2001	8/08–8/15	257	28.8	71.2	4.7	72.4	21.4	1.6	0.0
2002	7/13–8/14	171	42.1	57.9	0.6	42.1	53.2	3.5	0.6
2003	8/01–8/18	49	42.9	57.1	0.0	55.1	40.8	4.1	0.0
2004	8/03–8/18	248	52.4	47.6	16.5	60.9	21.8	0.8	0.0
2005	8/03–8/16	276	48.2	51.8	0.7	88.8	9.4	1.1	0.0

^a No test fishing occurred in 2000.

Appendix B4.—Comparison of length (mm) by age, sex, and year for Kobuk River test fish chum salmon catch, 1993–2005.

Year	Date	No. of Samples	Sex	Age Group				
				0.2	0.3	0.4	0.5	0.6
1993	7/17–8/12	462	Male	565	611	624	629	
			Female	557	580	594	623	
1994	7/13–8/29	624	Male	561	603	622	624	
			Female	559	587	601	599	
1995	7/13–8/16	1,025	Male	577	604	618	627	
			Female	553	588	595	599	
1996	7/09–8/18	1,633	Male	570	615	636	636	643
			Female	592	599	611	618	645
1997	7/09–8/14	756	Male	562	619	637	647	613
			Female	550	596	613	624	
1998	7/10–8/14	536	Male	577	618	636	636	
			Female	562	592	607	623	616
1999	7/17–8/13	913	Male	573	608	607	609	590
			Female		592	587	580	610
2000	7/07–8/14	635	Male	570	596	616	570	
			Female	566	581	591	580	
2001	7/06–8/13	930	Male	583	606	621	629	
			Female	575	583	599	622	
2002	7/05–8/12	793	Male	641	650	648	647	
			Female	565	608	617	608	614
2003	7/09–8/13	566	Male	588	636	655	679	
			Female	578	597	618	626	
2004	7/03–8/12	578	Male	600	627	624	650	668
			Female	577	590	595	596	600
2005	7/07–8/15	581	Male	575	622	642	639	
			Female		589	603	630	

Note: Length was measured from mideye to tail fork (METF).

Appendix B5.—Comparison of length (mm) by age, sex, and year for Kotzebue commercial chum salmon catch, 1993–2005.

Year	Date	No. of Samples	Sex	Age Group				
				0.2	0.3	0.4	0.5	0.6
1993	7/09–8/28	1,870	Male	589	619	633	641	701
			Female	572	597	610	620	625
1994	7/12–8/24	3,614	Male	567	601	621	629	
			Female	566	582	600	601	
1995	7/11–8/28	4,621	Male	577	614	625	638	638
			Female	574	592	602	614	
1996	7/08–8/26	2,386	Male	562	609	632	639	642
			Female	558	586	606	608	632
1997	7/10–8/29	4,824	Male	564	610	639	654	663
			Female	560	588	609	620	641
1998	7/10–8/30	3,128	Male	583	619	632	646	669
			Female	579	600	614	627	621
1999	7/13–8/27	3,288	Male	583	609	636	626	636
			Female	579	600	614	627	621
2000	7/11–8/24	3,179	Male	576	618	638	637	
			Female	572	593	611	615	
2001	7/10–8/24	3,670	Male	574	607	633	633	630
			Female	565	585	608	622	588
2002 ^a								
2003	7/22–8/19	969	Male	561	607	640	648	
			Female	555	587	615	633	
2004	7/13–8/20	1,472	Male	576	603	624	619	
			Female	553	591	602	627	600
2005	7/11–8/22	2,099	Male	572	616	638	610	
			Female	573	591	606	610	

Note: Length was measured from mideye to tail fork (METF).

^a No samples taken in 2002.

Appendix B6.—Comparison of length (mm) by age, sex, and year for Noatak River test fish chum salmon catch, 1993–2005.

Year	Date	No. of Samples	Sex	Age Group				
				0.2	0.3	0.4	0.5	0.6
1993	7/24–9/13	956	Male	542	581	604	625	652
			Female	539	558	572	562	650
1994	7/22–9/10	1,160	Male	543	580	604	643	
			Female	525	558	574	579	
1995	7/20–8/29	1,266	Male	576	597	609	622	620
			Female	547	569	576	589	600
1996	7/28–8/27	347	Male		608	631	639	608
			Female	547	593	604	616	
1997	7/27–8/28	214	Male		565	613	636	653
			Female		604	619	625	
1998	7/27–8/28	284	Male	560	606	621	634	
			Female	566	589	601	606	576
1999	8/14–8/29	140	Male	627	613	625	628	623
			Female	560	606	621	634	
2000 ^a								
2001	8/08–8/15	257	Male	567	600	627	655	
			Female	554	576	602	577	
2002	7/13–8/14	171	Male		625	646	692	683
			Female	590	603	616	590	
2003	8/01–8/18	49	Male		610	664	635	
			Female		594	618	635	
2004	8/03–8/18	248	Male	595	609	619	655	
			Female	564	594	597		
2005	8/03–8/16	276	Male	555	612	622	610	
			Female	560	590	604		

Note: Length was measured from mideye to tail fork (METF).

^a No test fishing occurred.

APPENDIX C. SHEEFISH

Appendix C1.—Kobuk River sheefish test fish mean daily and cumulative CPUE, 1997 and 1999–2005.

Date	1997		1999		2000		2001		2002	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/02										
7/03										
7/04										
7/05							20.87	20.87	30.00	30.00
7/06							22.45	43.32	16.11	46.11
7/07					24.25	24.25	64.27	107.59	25.00	71.11
7/08					34.17	58.42	48.17	155.76	17.94	89.05
7/09	0	0			34.77	93.19	35.46	191.22	23.83	112.88
7/10	13.64	13.64			40.00	133.19	33.57	224.79	17.94	130.82
7/11	9.74	23.38	25.04	25.04	23.23	156.42	30.50	255.29	16.33	147.15
7/12	6.29	29.67	23.66	48.70	22.45	178.87	37.05	292.34	23.08	170.23
7/13	^a	29.67	22.82	71.52	41.41	220.28	22.27	314.61	11.24	181.47
7/14	2.68	32.35	26.29	97.81	36.00	256.28	20.51	335.12	7.79	189.26
7/15	2.76	35.11	26.29	124.10	25.99	282.27	15.24	350.36	10.07	199.33
7/16	4.46	39.57	16.06	140.16	21.97	304.24	15.20	365.56	1.56	200.89
7/17	2.70	42.27	14.47	154.63	26.38	330.62	15.48	381.04	1.55	202.44
7/18	1.79	44.06	10.65	165.28	26.07	356.69	20.46	401.50	2.44	204.88
7/19	0	44.06	21.05	186.33	25.44	382.13	16.40	417.90	3.99	208.87
7/20	^a	44.06	21.20	207.53	23.14	405.27	19.74	437.64	2.21	211.08
7/21	1.76	45.82	9.33	216.86	14.27	419.54	19.42	457.06	1.48	212.56
7/22	0.89	46.71	27.23	244.09	1.71	421.25	1.95	459.01	1.54	214.10
7/23	2.70	49.41	6.09	250.18	1.71	422.96	8.96	467.97	1.45	215.55
7/24	4.40	53.81	9.46	259.64	4.30	427.26	5.81	473.78	4.83	220.38
7/25	2.70	56.51	16.06	275.70	5.96	433.22	13.28	487.06	6.63	227.01
7/26	1.84	58.35	5.07	280.77	7.55	440.77	13.14	500.20	1.52	228.53
7/27	12.26	70.61	10.64	291.41	7.47	448.24	24.94	525.14	0	228.53
7/28	5.94	76.55	^a	291.41	7.01	455.25	8.82	533.96	^a	228.53
7/29	2.64	79.19	0	291.41	11.64	466.89	10.32	544.28	4.98	233.51
7/30	2.23	81.42	1.66	293.07	14.16	481.05	14.29	558.57	4.82	238.33
7/31	0.86	82.28	0	293.07	16.15	497.20	13.97	572.54	5.92	244.25
8/01	0	82.28	0.85	293.92	10.47	507.67	6.75	579.29	1.64	245.89
8/02	0	82.28	4.17	298.09	6.36	514.03	7.45	586.74	3.32	249.21
8/03	0	82.28	1.26	299.35	1.67	515.70	5.53	592.27	1.63	250.84
8/04	0	82.28	4.95	304.30	4.68	520.38	4.04	596.31	^a	250.84
8/05	0	82.28	0.82	305.12	3.82	524.20	4.51	600.82	0	250.84
8/06	0	82.28	1.67	306.79	0	524.20	5.68	606.50	3.97	254.81
8/07	0	82.28	3.28	310.07	6.67	530.87	2.46	608.96	2.54	257.35
8/08	0	82.28	^a	310.07	4.38	535.25	1.56	610.52	3.42	260.77
8/09	0	82.28	0	310.07	0.75	536.00	1.64	612.16	6.88	267.65
8/10		82.28	0	310.07	2.16	538.16	0	612.16	4.24	271.89
8/11	0	82.28	0	310.07	0.80	538.96	0	612.16	0.85	272.74
8/12	0	82.28	0	310.07	0	538.96	0	612.16	4.26	277.00
8/13	1.15	83.43	0	310.07	1.71	540.67	2.61	614.77		
8/14	0	83.43			0	540.67				
8/15										

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Appendix C1.–Page 2 of 2.

Date	2003		2004		2005	
	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/02			9.41	9.41		
7/03			10.87	20.28		
7/04			16.42	36.70		
7/05			12.35	49.05		
7/06			9.26	58.31		
7/07			24.30	82.61	11.43	11.43
7/08			16.15	98.76	^a	11.43
7/09	60.54	60.54	23.08	121.84	^a	11.43
7/10	55.27	115.81	27.65	149.49	^a	11.43
7/11	31.60	147.41	12.00	161.49	13.89	25.32
7/12	32.29	179.70	13.71	175.20	16.31	41.63
7/13	24.44	204.14	20.06	195.26	17.09	58.72
7/14	9.09	213.23	3.02	198.28	23.47	82.19
7/15	10.47	223.70	8.46	206.74	17.58	99.77
7/16	8.38	232.08	1.50	208.24	25.10	124.87
7/17	7.62	239.70	2.31	210.55	16.20	141.07
7/18	14.72	254.42	15.34	225.89	15.24	156.31
7/19	11.50	265.92	14.52	240.41	11.01	167.32
7/20	11.53	277.45	3.76	244.17	8.33	175.65
7/21	11.89	289.34	8.38	252.55	17.45	193.10
7/22	16.10	305.44	20.80	273.35	12.83	205.93
7/23	8.89	314.33	11.32	284.67	12.73	218.66
7/24	5.14	319.47	13.67	298.34	8.20	226.86
7/25	6.49	325.96	9.09	307.43	0.76	227.62
7/26	3.39	329.35	8.38	315.81	8.28	235.90
7/27	9.18	338.53	6.15	321.96	6.08	241.98
7/28	5.12	343.65	13.82	335.78	4.68	246.66
7/29	2.11	345.76	3.07	338.85	0	246.66
7/30	6.70	352.46	0.75	339.60	2.24	248.90
7/31	12.81	365.27	5.25	344.85	3.84	252.74
8/01	13.46	378.73	5.32	350.17	2.94	255.68
8/02	6.21	384.94	18.68	368.85	2.11	257.79
8/03	6.61	391.55	25.19	394.04	9.44	267.23
8/04	8.20	399.75	14.96	409.00	3.08	270.31
8/05	2.30	402.05	13.90	422.90	3.06	273.37
8/06	0	402.05	14.35	437.25	1.56	274.93
8/07	1.32	403.37	8.46	445.71	4.53	279.46
8/08	0.71	404.08	4.26	449.97	8.08	287.54
8/09	1.47	405.55	21.69	471.66	7.66	295.20
8/10	0	405.55	5.57	477.23	7.03	302.23
8/11	0	405.55	17.14	494.37	0	302.23
8/12	0.74	406.29	14.88	509.25	0.93	303.16
8/13	1.26	407.55			2.70	305.86
8/14	0	407.55			0.90	306.76
8/15					0	306.76

Note: Days with no data indicate days when the project was not operational.

^a Regular day off.

Appendix C2.–Kobuk River sheefish test fish mean daily and cumulative CPUE proportions, 1997 and 1999–2005.

Date	1997		1999		2000		2001		2002	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/05							0.034	0.034	0.108	0.108
7/06							0.037	0.070	0.058	0.166
7/07					0.045	0.045	0.105	0.175	0.090	0.257
7/08					0.063	0.108	0.078	0.253	0.065	0.321
7/09	0.000	0.000			0.064	0.172	0.058	0.311	0.086	0.408
7/10	0.163	0.163			0.074	0.246	0.055	0.366	0.065	0.472
7/11	0.117	0.280	0.081	0.081	0.043	0.289	0.050	0.415	0.059	0.531
7/12	0.075	0.356	0.076	0.157	0.042	0.331	0.060	0.476	0.083	0.615
7/13	^a	0.356	0.074	0.231	0.077	0.407	0.036	0.512	0.041	0.655
7/14	0.032	0.388	0.085	0.315	0.067	0.474	0.033	0.545	0.028	0.683
7/15	0.033	0.421	0.085	0.400	0.048	0.522	0.025	0.570	0.036	0.720
7/16	0.053	0.474	0.052	0.452	0.041	0.563	0.025	0.595	0.006	0.725
7/17	0.032	0.507	0.047	0.499	0.049	0.612	0.025	0.620	0.006	0.731
7/18	0.021	0.528	0.034	0.533	0.048	0.660	0.033	0.653	0.009	0.740
7/19	0.000	0.528	0.068	0.601	0.047	0.707	0.027	0.680	0.014	0.754
7/20	^a	0.528	0.068	0.669	0.043	0.750	0.032	0.712	0.008	0.762
7/21	0.021	0.549	0.030	0.699	0.026	0.776	0.032	0.743	0.005	0.767
7/22	0.011	0.560	0.088	0.787	0.003	0.779	0.003	0.747	0.006	0.773
7/23	0.032	0.592	0.020	0.807	0.003	0.782	0.015	0.761	0.005	0.778
7/24	0.053	0.645	0.031	0.837	0.008	0.790	0.009	0.771	0.017	0.796
7/25	0.032	0.677	0.052	0.889	0.011	0.801	0.022	0.792	0.024	0.820
7/26	0.022	0.699	0.016	0.906	0.014	0.815	0.021	0.814	0.005	0.825
7/27	0.147	0.846	0.034	0.940	0.014	0.829	0.041	0.854	0.000	0.825
7/28	0.071	0.918	^a	0.940	0.013	0.842	0.014	0.869	^a	0.825
7/29	0.032	0.949	0.000	0.940	0.022	0.864	0.017	0.885	0.018	0.843
7/30	0.027	0.976	0.005	0.945	0.026	0.890	0.023	0.909	0.017	0.860
7/31	0.010	0.986	0.000	0.945	0.030	0.920	0.023	0.931	0.021	0.882
8/01	0.000	0.986	0.003	0.948	0.019	0.939	0.011	0.942	0.006	0.888
8/02	0.000	0.986	0.013	0.961	0.012	0.951	0.012	0.954	0.012	0.900
8/03	0.000	0.986	0.004	0.965	0.003	0.954	0.009	0.963	0.006	0.906
8/04	0.000	0.986	0.016	0.981	0.009	0.962	0.007	0.970	^a	0.906
8/05	0.000	0.986	0.003	0.984	0.007	0.970	0.007	0.977	0.000	0.906
8/06	0.000	0.986	0.005	0.989	0.000	0.970	0.009	0.987	0.014	0.920
8/07	0.000	0.986	0.011	1.000	0.012	0.982	0.004	0.991	0.009	0.929
8/08	0.000	0.986	^a	1.000	0.008	0.990	0.003	0.993	0.012	0.941
8/09	0.000	0.986	0.000	1.000	0.001	0.991	0.003	0.996	0.025	0.966
8/10	^a	0.986	0.000	1.000	0.004	0.995	0.000	0.996	0.015	0.982
8/11	0.000	0.986	0.000	1.000	0.001	0.997	0.000	0.996	0.003	0.985
8/12	0.000	0.986	0.000	1.000	0.000	0.997	0.000	0.996	0.015	1.000
8/13	0.014	1.000	0.000	1.000	0.003	1.000	0.004	1.000		
8/14	0.000	1.000			0.000	1.000				
8/15										

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Appendix C2.–Page 2 of 2.

Date	2003		2004		2005	
	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/02			0.018	0.018		
7/03			0.021	0.040		
7/04			0.032	0.072		
7/05			0.024	0.096		
7/06			0.018	0.115		
7/07			0.048	0.162	0.037	0.037
7/08			0.032	0.194	0.000 ^a	0.037
7/09	0.149	0.149	0.045	0.239	0.000 ^a	0.037
7/10	0.136	0.284	0.054	0.294	0.000 ^a	0.037
7/11	0.078	0.362	0.024	0.317	0.045	0.083
7/12	0.079	0.441	0.027	0.344	0.053	0.136
7/13	0.060 ^a	0.501	0.039	0.383	0.056	0.191
7/14	0.022	0.523	0.006	0.389	0.077	0.268
7/15	0.026	0.549	0.017	0.406	0.057	0.325
7/16	0.021	0.569	0.003	0.409	0.082	0.407
7/17	0.019	0.588	0.005	0.413	0.053	0.460
7/18	0.036	0.624	0.030	0.444	0.050	0.510
7/19	0.028	0.652	0.029	0.472	0.036	0.545
7/20	0.028	0.681	0.007	0.479	0.027	0.573
7/21	0.029	0.710	0.016	0.496	0.057	0.629
7/22	0.040	0.749	0.041	0.537	0.042	0.671
7/23	0.022	0.771	0.022	0.559	0.041	0.713
7/24	0.013	0.784	0.027	0.586	0.027	0.740
7/25	0.016	0.800	0.018	0.604	0.002	0.742
7/26	0.008	0.808	0.016	0.620	0.027	0.769
7/27	0.023	0.831	0.012	0.632	0.020	0.789
7/28	0.013	0.843	0.027	0.659	0.015	0.804
7/29	0.005	0.848	0.006	0.665	0.000	0.804
7/30	0.016	0.865	0.001	0.667	0.007	0.811
7/31	0.031	0.896	0.010	0.677	0.013	0.824
8/01	0.033	0.929	0.010	0.688	0.010	0.833
8/02	0.015	0.945	0.037	0.724	0.007	0.840
8/03	0.016	0.961	0.049	0.774	0.031	0.871
8/04	0.020	0.981	0.029	0.803	0.010	0.881
8/05	0.006	0.987	0.027	0.830	0.010	0.891
8/06	0.000	0.987	0.028	0.859	0.005	0.896
8/07	0.003	0.990	0.017	0.875	0.015	0.911
8/08	0.002	0.991	0.008	0.884	0.026	0.937
8/09	0.004	0.995	0.043	0.926	0.025	0.962
8/10	0.000	0.995	0.011	0.937	0.023	0.985
8/11	0.000	0.995	0.034	0.971	0.000	0.985
8/12	0.002	0.997	0.029	1.000	0.003	0.988
8/13	0.003	1.000			0.009	0.997
8/14	0.000	1.000			0.003	1.000
8/15					0.000	1.000

Note: Days with no data indicate days when the project was not operational.

^a Regular day off.

Appendix C3.—Kobuk River sheefish test fish comparison, 1997–2005.

Year	Project Operation Dates	Number of test fish drifts	Number of days off inseason ^a	Rank by number of drifts	Cumulative CPUE	Rank by cumulative CPUE
1997	7/09–8/14	202	3	7	83.43	8
1999	7/11–8/13	176	2	8	310.07	5
2000	7/07–8/14	228	0	3	540.67	2
2001	7/05–8/13	232	0	2	614.77	1
2002	7/05–8/12	218	2	4	277.00	7
2003	7/09–8/13	214	0	5	407.55	4
2004	7/02–8/12	242	0	1	509.25	3
2005	7/07–8/15	207	3	6	306.76	6

^a Number of days during the season where the crew had the day off and no test fishing occurred.

Appendix C4.—Kobuk River sheefish test fish time and site distribution expressed as mean CPUE, 1997–2005.

Year	Mean CPUE by Drift Period ^a			Period Yearly Mean CPUE	Percent Mean CPUE by Drift Period			Mean CPUE by Site ^b		Site Yearly Mean CPUE	Mean CPUE by Site	
	1	2	3		1	2	3	N	S		N	S
1997	2.5	2.4	2.5	2.5	33.7	32.8	33.5	0.3	1.7	1.0	16.1	83.9
1999	10.0	10.7	10.5	10.4	32.0	34.4	33.6	1.6	5.3	3.4	22.8	77.2
2000	12.7	14.2	15.2	14.0	30.1	33.7	36.2	2.8	6.6	4.7	29.7	70.3
2001	13.8	15.9	17.2	15.6	29.5	34.0	36.6	4.1	6.5	5.3	38.5	61.5
2002	7.0	7.0	7.2	7.1	33.0	33.0	34.0	1.5	3.5	2.5	30.7	69.3
2003	10.6	9.8	12.2	10.8	32.5	30.0	37.5	2.5	5.0	3.8	33.3	66.7
2004	11.1	11.4	12.9	11.8	31.4	32.3	36.4	3.6	4.8	4.2	42.9	57.1
2005	9.0	8.7	7.5	8.4	35.7	34.5	29.8	2.0	4.0	3.0	33.5	66.5

^a Drift 1 begins at 0800 hours, Drift 2 at 1500 hours, and Drift 3 at 2200 hours. There are 2 drifts (one on each riverbank) in each drift period.

^b Site N is the north bank and Site S is the south bank. The Mean CPUE is the cumulative CPUE for each riverbank for the season divided by the number of drifts on that riverbank during the season.